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## ANÆSTHESIA IN LABOUR AND CÆSAREAN SECTION.<sup>1</sup>

By CLIVE N. PATON, M.B., Ch.M., D.A. (Sydney),  
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From the year 1847, when James Simpson first succeeded in reducing the agony of travail by the use of chloroform vapour inhalations as an analgesic, few variations or innovations in this direction were made for a period of eighty years.

Efforts at improving obstetric analgesia were confined to Klikovitch's attempt to employ nitrous oxide in 1880 and to the introduction of "twilight sleep" by Steinbüchel, Krönig and Gauss in 1900, of "Avertin" in 1926, and of Gwathmey's rectal ether technique in 1923. All of these methods of analgesia were later abandoned or modified, because of obvious imperfections or poor results. However, during the past two decades, with the rapid development of the science and art of modern anæsthesia, almost their entire weight has been brought to bear upon the complex problem of finding safe, satisfactory and practicable forms of analgesia and anæsthesia for the conduct of labour either by obstetrical or by surgical means.

The complexity of the problem rests on the following fundamental features of obstetric anæsthesia:

1. Two individuals are influenced by the anæsthetic materials and technique—the mother and the child. Their reactions to the various forms of anæsthesia are not necessarily the same, and what may be advantageous for one may be deleterious to the other.

2. Labour must be regarded as a physiological process and the anæsthesia employed must interfere with this to a minimum degree.

<sup>1</sup>Read at a meeting of the New South Wales Branch of the British Medical Association on June 26, 1947.

3. The three stages of labour each call for specific forms of relief, and the methods suitable for one stage are not necessarily applicable to the others.

4. The increasing frequency with which Cæsarean section is now performed has brought this operation into close relationship with all modern forms of anæsthesia used for major surgical procedures.

The matter may be dealt with under three main headings, namely: (i) analgesia for the first stage, (ii) anæsthesia for the second stage, (iii) anæsthesia for Cæsarean section and obstetric operations.

### Analgesia for the First Stage.

The essential requirements of a satisfactory analgesic in the first stage are that it shall produce a substantial amount of relief from pain without loss of activity on the part of the primary or secondary powers or of the patient's ability to cooperate. A high degree of amnesia should also be achieved.

The short-acting barbiturates stand high in popular favour for this purpose. These include "Nembutal", "Seconal", "Sodium Amytal" and "Pentothal Sodium" (the last-mentioned in freshly prepared capsules of three grains each).<sup>(1)</sup> All have their devotees, but fundamentally they all have the same action. A high degree of amnesia is usually attained; but these drugs are but soporifics and not true analgesics—that is, they afford little or no protection to the higher centres against the repeated pain impulses of uterine contractions.

Some inconsistency of action is worth noting. Some patients appear to be curiously resistant, whilst others exhibit excitement and delirium. It has been suggested in this regard that a trial dose should be given to patients during the last few weeks of pregnancy to determine their reaction.

The barbiturates are respiratory depressants and tend to increase the occurrence of fetal asphyxia. Maternal cooperation is frequently impaired, and the incidence of forceps deliveries is therefore relatively high.

Latterly the barbiturates have been accompanied by an initial injection of scopolamine ( $\frac{1}{100}$  to  $\frac{1}{100}$  grain). The drugs are synergistic, and analgesia is prolonged and enhanced. However, the above-mentioned disadvantages are emphasized. In one series of 312 patients treated with "Nembutal" and scopolamine, 50% required forceps delivery, and twelve babies showed signs of asphyxia.<sup>(9)</sup> All barbiturates in large doses decrease the frequency and tone of uterine contractions and are passed unchanged through the placenta to the fetus.<sup>(9)</sup>

#### Morphine and Other Alkaloids of Opium.

Morphine as an analgesic drug stands alone with regard to rapidity and consistency of action. It is a true analgesic, in contradistinction to the barbiturates, which are merely amnesic and soporific. However, it is a strong respiratory depressant and passes unchanged through the placenta to the fetus—a fact which has led to some undue prejudice against its use.<sup>(10)</sup> Mengert, in 1942, after extensive investigations of various forms of analgesia in 800 cases (and using 700 cases as controls, in which no analgesia was used), concluded that there was a higher incidence of foetal distress in babies whose mothers had received morphine, but that it was such as to be easily combated by the usual resuscitative measures.

All authorities are agreed that the danger of foetal respiratory distress is increased if morphine is administered later than the third hour before delivery, and further, that the use of morphine in premature labour doubles the rate of foetal mortality.

Morphine and scopolamine used together act synergistically and form the basis of the old-established technique of "twilight sleep". The addition of scopolamine has the effect of prolonging and enhancing the analgesic action of morphine.<sup>(11)</sup>

The experiments of Snyder and Lim<sup>(12)</sup> suggest that the deleterious effect of morphine on the fetus is due rather to its action on the mechanism of labour than to a direct depressant action on the fetus. We know that the effect of morphine on plain muscle is to increase its tone, and even to bring about fibrillary twitching of individual fibres. In the uterus these changes have the effect of inducing some degree of spasm, with a progressive diminution in the size of the placental site. As this has a definite relationship to the vital requirements of the fetus, the result must be progressive disturbance of carbon dioxide-oxygen balance in the foetal circulation.

#### Other Drugs.

Pethidine or "Demerol", a synthetic ethyl-ester of piperidine, has become increasingly popular as an obstetric analgesic in recent years. It has qualities like both morphine and atropine without many of the disadvantages of either. Its strong vago-depressive action endows it with strong spasmolytic qualities producing marked relaxation of the cervix and removing any tendency to spasm on the part of the fundus. It is used in doses of 100 milligrammes given intramuscularly, and repeated as often as indicated, as many as five or six doses being given in this manner. Scopolamine given with the first dose prolongs and enhances its action. Pethidine also has a central analgesic action, but produces no narcosis. When large doses are given some foetal depression results, which is usually easy to overcome by the usual means. It approaches closest to the ideal for first-stage analgesia.

Trichlorethylene is another recent addition to the drugs available for first-stage analgesia. It has the formula  $\text{CCl}_3\text{CHCl}$ , and is a non-irritating, non-toxic and non-inflammable liquid artificially coloured blue to distinguish it from chloroform, which it resembles in odour. Unlike most heavily chlorinated products, its toxic effect on the liver is low and it is capable of producing satisfactory analgesia and sedation in very low concentrations. However, its low volatility precludes its use on an open mask, and it must be vaporized in a closed container. For this purpose a specially designed semi-automatic inhaler has been designed. The patient is able to control the analgesia herself, and the apparatus is so arranged that a state of

analgesia only is maintained and surgical anaesthesia is never established.<sup>(13)</sup>

#### Intravenous Sedation.

In severe toxæmia intravenous sedation is well established by means of one gramme of "Pentothal Sodium" dissolved in 1000 millilitres of a 5% dextrose solution. This mixture is installed in an intravenous drip apparatus, and considerable sedation is effected, the drip rate being varied as required. "Pentothal Sodium" is broken down very rapidly, even by the damaged liver.

Paraldehyde has a powerful amnesic effect and a less pronounced degree of efficiency as an analgesic. Alone it is apt to produce a high incidence of excitement. To obviate this disadvantage it has been used concurrently with "Nembutal", "Seconal" and even morphine. The last-named combination causes a sharp rise in the number of heavily narcotized babies. At the Women's Hospital, Sydney, extensive trial has been made of "Seconal" in combination with paraldehyde. In an effort to eliminate the taste and smell, the paraldehyde was put up in capsules each containing 17 minims, and these were then frozen solid in a domestic refrigerator. Three grains of "Seconal" were given at the beginning of labour, followed fifteen minutes later by six capsules of paraldehyde. Two more capsules were given if the patient was noticed to stir between contractions. Analgesia and amnesia were obtained in 86.7% of cases in a total of 279. Labour was not prolonged, although the incidence of forceps deliveries was raised to as high as 35% in the case of *primipara*. The babies in these cases breathed spontaneously and had normal neonatal performances. There was a slight increase in the incidence of post-partum oozing. The average dose of paraldehyde was 9.2 millilitres.

Rectal analgesia enjoys wide popularity in the United States of America, the commonly used agents being ether and paraldehyde. "Avertin" has long been abandoned because of unsatisfactory results. Ether is given in the form of a small enema consisting of two and a half ounces of ether and olive oil to four ounces towards the close of the first stage, the earlier portion of which is conducted under barbiturate analgesia.

Paraldehyde is given in doses of 1.2 millilitres per 10 pounds of body weight, well diluted with normal saline solution. It should be given at a similar stage in labour. Both ether and paraldehyde have the same pharmacological action when given in this manner as when given orally. They are particularly useful in cases in which the patient is vomiting. Paraldehyde given *per rectum* is particularly useful in the treatment of the eclamptic and preeclamptic patient, for in sufficient dosage and repeated often enough it prevents convulsions and lowers blood pressure. In such cases ten drachms of paraldehyde in four ounces of olive oil are given at the outset and repeated as narcosis diminishes. In this manner 120 to 130 drachms have been given over a period of four days. In the employment of rectal analgesia, especially in the treatment of the unconscious patient, the closest attention to detail in actual administration is essential.

#### Anæsthesia for Second Stage.

As the passive first stage of labour passes into the active second stage, analgesia must be replaced by light surgical anaesthesia of an intermittent type, gradually deepening to full surgical anaesthesia with complete relaxation for delivery. Almost every known form of anaesthesia has been employed for this purpose and the ideal has yet to be found. The management of a confinement has long been regarded as a one-man job, and this fact has done much to retain in popular favour types of anaesthesia which are easy to administer and relatively safe, and which do not necessitate the employment of complicated and expensive apparatus. Hence chloroform and ether are still much in popular use.

Chloroform has been in constant use for second-stage anaesthesia for 100 years; but despite this it has many disadvantages. The same care and attention to colour, pulse rate, airway and depth are necessary as in chloroform administration generally, and there is no scientific

basis for the common belief that the parturient woman is not prone to the same risks and hazards of chloroform anaesthesia as the ordinary patient. Nevertheless, administration is comparatively easy, and the reversibility of chloroform anaesthesia is a distinct advantage. However, chloroform is a cardiac and respiratory depressant, and its toxic action on liver and kidneys is well known. Its use over long periods invariably leads to deep anaesthesia of the infant, and adds to the risk of damage to the maternal liver. It inhibits uterine contractions and may therefore delay delivery or conduce to post-partum oozing. However, it has but a slight inhibitory action on the effect of pituitary extract on the uterus. It is of great value in relaxing spasmodic contraction of the uterus.

Ether has but one advantage as an anaesthetic agent in second-stage anaesthesia, and that is the extreme relaxation for delivery which it gives. Among its disadvantages are its objectionable odour, its irritating effect on the respiratory passages, the stimulation of salivation, nausea and vomiting, and the long periods of induction and recovery. It inhibits uterine contractions and so tends to increase post-partum oozing. These points apply whether ether is given on the open mask or in an inhaler of the T. H. Small type. The oxygen content of the foetal arterial blood is slightly lowered; but there is no high incidence of apnoeic babies. Babies born of mothers anesthetized with ether have a better neonatal performance than those of mothers receiving no anaesthesia or other forms of it.<sup>(10)</sup>

Nitrous oxide and oxygen probably provide the best form of analgesia for second-stage labour when properly administered. Forms of technique based on self-administration have yielded disappointing and patchy results. The extreme reversibility of this form of anaesthesia is its great advantage; but few patients remain sufficiently calm and cooperative during the second stage of labour to use a suitable unit advantageously. The assistance of an anaesthetist allows satisfactory anaesthesia to be maintained in intermittent fashion over long periods. However, concentrations of over 85% of nitrous oxide in the mixture used lead to a high incidence of foetal asphyxia if it is given over any but short periods of four or five minutes. When relaxation is desired, for delivery or for the performance of obstetric manoeuvres, it is essential to work with an adequate proportion of oxygen and the addition of a small quantity of some adjuvant such as ether.

Nitrous oxide has a slight inhibitory effect on uterine contractions, insufficient to affect the progress of labour, but noticeable in some delay in expulsion of the placenta. The effect of pituitary extract is slightly inhibited. The best results are obtained only by the expert, and failures and disappointments are often the result of inexperienced usage. Some wide claims have been made for the efficacy of nitrous oxide and oxygen anaesthesia in controlling convulsive seizures in eclampsia. It seems probable, especially in view of the low proportion of nitrous oxide sometimes used (55%), that any improvement may be due rather to respiratory stimulation and increased pulmonary ventilation than to any anaesthetic effect of the combination. Apart from the breaking down of some of the acidosis present, the increased pulmonary ventilation must reduce the degree of stagnant anoxia and lead to improved "oxygenation" in general and especially in the central nervous system.

Low spinal anaesthesia was first used in obstetrics as long ago as 1900, but has not been generally accepted. If the third, fourth and fifth sacral nerves are blocked, complete relaxation of cervix, vagina and perineum is obtained, and with the newer spinal anaesthetic agents available and a better understanding of the technique, good results should be obtainable. Pitkin in 1928 published an account of 273 patients at confinement treated or controlled by spinal anaesthesia. A heavy solution of "Novocain" was used, and excellent results were claimed, with no deleterious effect on mother, child or the mechanism of labour.<sup>(11)</sup>

Continuous caudal anaesthesia, used for surgical purposes since 1901, was developed and adapted to obstetric practice by Hingson and Edwards in 1942.<sup>(12)(13)(14)</sup> The fundamental principle underlying this method of anaesthesia is the

utilization of the peculiar anatomical arrangements of the contents of the sacral canal to effect continuous blocking, with a suitable anaesthetic solution, of all sensory trunks associated with the pain of labour. This blocking is achieved in the sacral canal and in the extradural space through which the anaesthetic solution rises. It is not possible here to deal in any detail with the technique as laid down by the originators. It is held that analgesia is highly satisfactory and that the condition of mother and child remains unimpaired. However, administration appears to be difficult and hazardous, and this fact must confine the use of this form of anaesthesia to large obstetric institutions and to small groups of specially trained operators.

Intravenous anaesthesia for delivery is being more widely used, and provided delivery is carried out expeditiously and efficiently, the dose used should be moderate and insufficient to affect the fetus adversely. However, it is suggested that the assistance of a colleague familiar with the technique of intravenous anaesthesia should be sought for this procedure, rather than that the *accoucheur* himself should induce anaesthesia and then proceed to manage delivery, leaving the care of the patient to a nurse.

#### Cæsarean Section.

Cæsarean section is now widely used as a means of delivery for a great variety of reasons, and the patients from the anaesthetist's angle appear to consist of the following two main groups. (i) Those in whom the operation is carried out at full term because of some serious obstacle to delivery by normal labour. This group largely consists of fit women, the remainder being made up of those suffering from grave physical disability, such as cardiac or pulmonary disease, diabetes, severe anaemia *et cetera*. (ii) Those in whom labour has already been in progress. In these cases some degree of exhaustion, shock or dehydration or of severe blood loss may be present. In cases of toxæmia, inefficient liver and kidney function, hyperplasia and even active convulsions add to the hazards of anaesthesia.

These facts all have an intimate bearing on the selection of a suitable form of anaesthesia, and make obvious the fact that no one form of anaesthesia is applicable in all cases. However, the surgical requirements of anaesthesia present no great problem. No extreme degree of relaxation is required for the opening and evacuation of the uterus, and after this the large amount of redundancy in the abdominal wall facilitates closure of the uterus and abdomen. In the lower segment operation some deepening of anaesthesia is called for during the following procedures: (a) insertion of the large self-retaining retractor used in the lower angle of the wound; (b) stripping of the peritoneum and bladder from the anterior surface of the uterus.

Premedication before Cæsarean section is a matter of some controversy. Sedation is desirable before such an ordeal, but should be limited to a minimum. Morphine (one-sixth of a grain) does no harm and fulfils all requirements. This should be given with atropine (one one-hundredth of a grain) thirty minutes before the operation is commenced. Atropine in full doses is strongly indicated before all forms of general anaesthesia in order to depress over-activity of the parasympathetic reflexes. In the parturient woman these reflexes are very active. Pethidine in doses of 50 to 100 milligrammes has the same effect as morphine and atropine, but no narcotic effect.

Heavy sedation is neither desirable nor necessary.

#### Inhalation Anaesthesia.

*Chloroform and Ether.*—The disadvantages of chloroform and ether, two agents already mentioned, render them unsuitable for anaesthesia for Cæsarean section, and they should not be used when other forms of anaesthesia are available.

*Nitrous Oxide and Oxygen.*—Because of its non-toxic and non-irritating character, the combination of nitrous oxide and oxygen forms a desirable form of anaesthesia. Induction and recovery are rapid; but the maintenance of surgical anaesthesia necessitates a high concentration of



nitrous oxide with a correspondingly low proportion of oxygen. This leads to a lowering of oxygen concentration in the fetal circulation with a consequent high incidence of fetal asphyxia. It is far better practice to add a small quantity of ether to the mixture and maintain the proportion of oxygen at a safe working level. The operation may be completed with the addition of two or three drachms of ether; the mother's oxygenation is satisfactory at all times, and the infant is singularly unaffected.

**Cyclopropane.**—Cyclopropane, also non-toxic and non-irritating, is an elegant anæsthetic agent for this operation. It is given in an atmosphere rich in oxygen, and properly administered safeguards both mother and child against anoxia. It stimulates uterine contractions and produces a hard, firmly contracted uterus after emptying. Induction is rapid and relaxation adequate. Among the disadvantages of cyclopropane are a tendency to troublesome capillary oozing and to gagging and laryngospasm during induction.

**Combined Anæsthesia.**—Intravenous anæsthesia with "Pentothal Sodium" supported by the simultaneous administration of nitrous oxide and oxygen in 50% combination has yielded satisfactory results. The two anæsthetic agents are synergistic, so that the required amount of each is reduced. The stimulating action of the nitrous oxide on respiration reduces considerably the depression produced by the "Pentothal Sodium", and the rich proportion of oxygen safeguards mother and child against the occurrence of anoxia. This form of anæsthesia is eminently acceptable to the patients and fulfils all surgical requirements. Relaxation is adequate and the uterus is firmly contracted, so that the blood loss is minimal. There is no greater mortality or morbidity among babies whose mothers are anesthetized in this fashion than when other forms of anæsthesia are used.<sup>(43)</sup> At least twelve minutes elapse before the concentration of "Pentothal Sodium" in the maternal and fetal circulations becomes equalized. This does not imply any need for undue haste in performance of the operation, but makes it essential that anæsthesia be induced only after all the usual surgical preliminaries have been completed. When a suitable anæsthetic machine is not available, oxygen rebreathed through a Waters cannister is a useful substitute.

In 50 of my own cases in which this type of anæsthesia was used, the average dose of "Pentothal Sodium" was 1.3 grammes. The lower segment operation was performed in 43, and the number of patients operated upon at term and during labour was equal. Fourteen different surgeons operated and no difficulties were encountered. None of the mothers was adversely affected by the anæsthesia. Thirty-three babies breathed spontaneously and ten breathed within three minutes of delivery. Two babies, in whose delivery serious obstetric difficulties were encountered, died within forty-eight hours. The remaining five babies breathed within periods varying from three to ten minutes after application of the usual means of stimulation had been carried out. Premedication in ten cases consisted of an intramuscular injection of pethidine thirty minutes before operation, and in the remaining forty atropine sulphate (one one-hundredth of a grain) was given hypodermically at a similar period. Maternal recovery from the anæsthesia was prompt, and the babies in general had a normal neonatal performance. Six babies were prematurely delivered.

**Spinal Anæsthesia.**—Spinal anæsthesia for Cæsarean section offers two main advantages—excellent operating conditions and a minimum of fetal depression. It must be admitted that there exists a very real prejudice against its use; but the suggestion is made that this attitude may be based on poor or disastrous results in the past, owing to the use of faulty technique or unsatisfactory solutions, before our knowledge of spinal analgesia was firmly and accurately based. Many successful series of cases have been reported in recent years, which show that the operation can be carried out successfully and safely under spinal anæsthesia when the indication for it exists. C. M. Marshall<sup>(44)</sup> stresses the surgical comfort afforded by spinal anæsthesia, and further emphasizes the diminished hemorrhage and entire lack of atony of the uterus, the absence of any toxic effect on liver, kidneys or metabolism, and

the relative freedom from post-operative meteorism and paralytic ileus. Thomas,<sup>(45)</sup> reporting 121 successful cases, agrees with all these points and stresses the entire absence of any untoward effect on the child. Spinal anæsthesia has an established place in relation to Cæsarean section, but there are definite criteria governing its use. (i) Patients must be selected with care, and all those likely to behave badly should be excluded. These include all those with a systolic blood pressure below 100 millimetres of mercury, all who are subjects of recent serious blood loss, shock, exhaustion from prolonged labour or severe fluid loss from persistent vomiting, and all those with over-distension from hydramnios, twins *et cetera*. (ii) An anæsthetic agent which is rapidly fixed and whose level of anæsthesia is quickly determined must be employed. The hyperbaric solution of "Nupercaine" (1:200) is admirably suitable. (iii) Free use must be made of the pressor drugs epinephrine and "Neosynephrin" for the prevention and relief of hypotension, and the use of continuous oxygen therapy throughout the operation is essential. (iv) The anæsthetist must be an expert, thoroughly conversant with the management of spinal anæsthesia.

#### Conclusion.

From this brief outline it must appear that no perfect form of obstetric anæsthesia has yet been devised, so many and varying are the requirements of the mother, child and obstetrician; but it may be fairly claimed that modern anæsthesia has, during the last two decades, done much to fulfil many of those requirements.

Quite recently emphasis has been placed on the importance of the psychological preparation of the pregnant woman for the ordeal of labour—an ordeal which is rightly held to be as much mental as physical. The object of this psychological preparation is the elimination of fear and tension from the patient's mind, so that the element of pain is reduced to a minimum. There can be no doubt that its achievement must go far towards ensuring the success of whatever form of analgesia or anæsthesia is employed during labour.

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LOCAL ANÆSTHESIA IN OBSTETRICS.<sup>1</sup>

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## INTRODUCTION.

THE essential condition to be fulfilled, when anaesthesia or analgesia in labour and delivery is contemplated, is the provision of maximum safety to the mother and baby. Any agent which produces anaesthesia to the degree of unconsciousness in the mother must produce such a condition in the unborn fetus, for it is reasonable to assume that an anaesthetic agent which can narcotize the cells of the maternal central nervous system, can diffuse through the walls of the chorionic villus and produce similar effects on the fetus. Local anaesthesia must therefore appeal, as the only effect is maternal—the fetus should be unaffected. This paper is written to bring to notice two relatively simple techniques which do not require the assistance of the specialist anaesthetist and which are available for use by even the occasional operator, namely, pudendal nerve block and perineal infiltration, and local infiltration anaesthesia for Cæsarean section. Considerable work has been done in both these methods at the Women's Hospital (Crown Street) and the opinions expressed are those of the author and of the honorary medical staff. It is believed that both these methods are very valuable adjuncts to an obstetrician's armamentarium and the results fully justify their adoption.

## Equipment.

For all local anaesthesia work satisfactory equipment is essential. By using Pitkin "Luer-Lok" syringes connected to a small flask of local anaesthetic solution, I have found that time can be reduced to a minimum for the completion of anaesthesia, for both pudendal nerve block and abdominal infiltration.

The anaesthetic agent used in all the work at the Women's Hospital has been 1.5% solution of "Metycaine" which has been singularly non-toxic. In the whole series of cases there has been but one in which any reaction to the anaesthetic agent was reported.

## PUDENDAL BLOCK AND PERINEAL INFILTRATION.

## Anatomy.

As in all local anaesthesia techniques, it is essential that the anatomy of the part and in particular the nerve supply be thoroughly understood. The pudendal nerve arises from the second, third and fourth sacral nerves, passes out of the pelvis through the greater sciatic foramen, lies on the sacro-spinous ligament or the spine of the ischium, and then enters the perineum through the lesser sciatic foramen. At the base of the urogenital diaphragm it divides into its terminal branches, the perineal nerve and the dorsal nerve of the clitoris. The inferior hemorrhoidal nerve may arise independently from the third and fourth sacral nerves or arise from the pudendal nerve. Its muscular branches end in the external anal sphincter muscle. The pudendal nerve proper supplies the skin of the labia, the anterior part of the *levator ani*, the external *sphincter ani*, the superficial and deep transverse perineal muscles, the ischio-cavernosus and the vulvo-cavernosus muscles, and the sphincter of the membranous urethra. The bulb, anterior urethra and clitoris are also supplied. The posterior cutaneous nerve of the thigh has a perineal branch which runs medially and anteriorly just distal to the ischial tuberosity. Other minor cutaneous branches run to the perineum from the ilio-inguinal nerve. Blocking these various nerves which supply the perineal structures produces both anaesthesia to the perineum and vagina and also relaxation of the perineal muscular structures. (See Figure II.)

## Technique.

A full aseptic technique is maintained at all times. A small weal is made at the junction of the anterior two-thirds and posterior third of each *labium majus*. A 22 or 23 gauge needle is then used to infiltrate the labium up to the *mons veneris* and posteriorly to a point about two centimetres lateral to the anus. It is not advisable to infiltrate the posterior commissure as this tears too readily when sodden with local anaesthetic solution. This first step in the technique blocks the incoming peripheral nerves, and requires about ten millilitres of anaesthetic solution for each side. The next step is to locate the ischial spine by vaginal examination. It can usually be identified as a bony promontory on the postero-lateral wall of the pelvis or at the junction of bone with the sacro-spinous ligament. To reach it, a 4.5 inch needle—again preferably 22 or 23 gauge with a safety breaking point—is required. This is introduced through the same needle

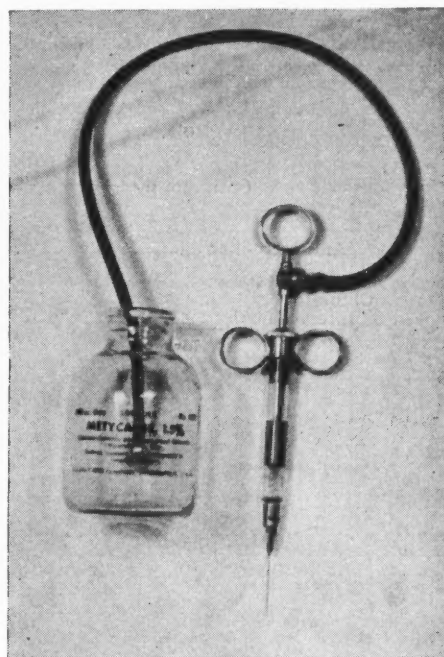


FIGURE I.

Equipment employed for local anaesthesia.

hole as that previously used and the point guided by the vaginal finger towards the ischial spine. One difficulty with the fine needle is that it is occasionally deflected by the *levator ani* if the latter has good tonus. When the point is in apposition with the ischial spine it is withdrawn about one centimetre and deflected slightly laterally. Eight millilitres of anaesthetic solution are then injected, precautions having been taken to see that the needle is not in a vein. The needle is next withdrawn to the *levator ani* which can be felt as a firm band in the side wall of the vagina about one and a half inches from the vulva. Two to three millilitres of anaesthetic solution are injected into the muscle and the needle is withdrawn to the subcutaneous fat. The ischial tuberosity is then identified by palpation and about four millilitres are injected slightly distal to it. Finally the needle is withdrawn and the same procedure adopted on the other side. A total volume of about 25 millilitres of anaesthetic solution is used on each side and the average time for a complete block to be carried out, once the technique has been mastered, is about five minutes. Complete relaxation of the pelvic floor is almost immediate.

<sup>1</sup> Read at a meeting of the New South Wales Branch of the British Medical Association on June 26, 1947.

### Dangers of Pudendal Block.

#### Introduction of Sepsis.

Sepsis has not occurred once in a total of many hundreds of cases at the Women's Hospital (Crown Street).

#### Intravenous Injection.

Intravenous injection is prevented by care during the injection. One patient did complain of generalized analgesia following a pudendal block. The symptoms lasted about ten minutes during which time she did not experience any uterine pain even though her uterus was contracting and had up to the time of the injection been causing her pain.

#### Formation of Hæmatomata.

Hæmatomata would be most serious in the region of the ischial spine, but I believe that they can be prevented by care, as in my personal series there has not been one. Varicosities of the vulva are occasionally punctured with resultant hæmatomata. These have never given any serious trouble.

anæsthetist precludes the patient from having a general anæsthetic, the use of the technique is considered to be indicated. It has been used as a routine for the delivery of patients with diabetes, cardiac or pulmonary disease, and severe pre-eclampsia.

#### The Premature Infant.

Since the adoption of this technique (in addition to a large episiotomy) for the delivery of the premature infant, the survival rate of technically viable premature infants has increased. I, personally, am convinced that this is by far the best method for delivery of the premature baby.

#### Breech Deliveries.

The use of the technique in association with breech deliveries could readily be the subject of a separate paper, to such an extent has the method aided the safe delivery of the infant presenting by the breech. The delivery of the *primipara* with this presentation has several problems which general anæsthesia does not solve. It is most

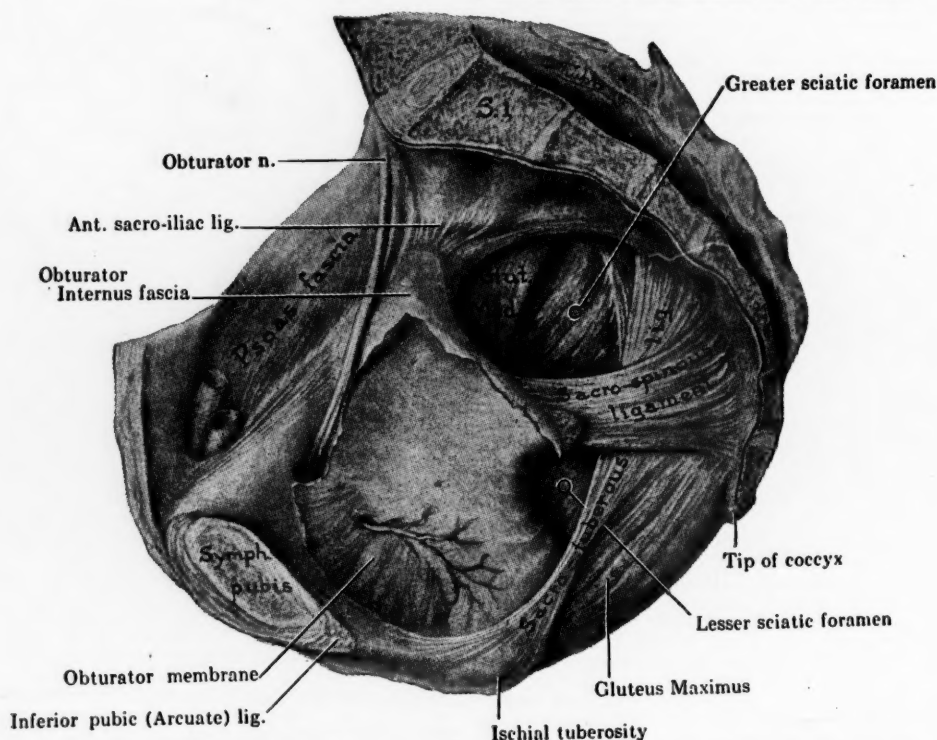


FIGURE II.—The walls of the female pelvis (Grant's "Atlas of Anatomy", Figure 129). Eight millilitres of 1.5% solution of "Metycaine" are injected into the lesser sciatic foramen (O) where the pudendal nerve enters the pelvis.

### Limitations of Pudendal Block and Perineal Infiltration.

As the anæsthesia extends up the whole vagina to, but not including, the cervix, any manipulation which requires the introduction of a hand or instrument into the lower uterine segment will cause pain. It will be noted that, in the report on breech deliveries (*vide infra*), extended arms have been brought down. It is far better to induce light chloroform anæsthesia if any difficulty is encountered with the arms. Low forceps can be applied with painless ease and, of course, episiotomy and repair are very easily performed.

### Indication for the Use of Pudendal Block and Perineal Infiltration

#### Condition of the Mother.

When the application of low forceps is indicated and the condition of the patient or the non-availability of an

desirable in the uncomplicated case that the woman use her own powers to expel the fœtus. An episiotomy is also necessary when the breech bulges the perineum, and it is also essential in those last agonizing minutes that the patient be not worried by the intense pain which a distended perineum and vagina can cause. It is really remarkable how cooperative and quiet the restless patient, who is endeavouring to expel the breech, can become, once the perineal infiltration and pudendal block are effected. This technique answers all the requirements—the only drawback being that occasionally chloroform anæsthesia is required for the delivery of an extended arm or head.

### Results.

I should like to present some figures for delivery of infants with breech presentations in *primipara* at the Women's Hospital since 1944 (Table I). Shortly after

the commencement of this method in 1944, Greig's work<sup>(1)</sup> was published. Our techniques, developed independently, have been more or less identical, and the figures given below justify the adoption of this method of delivery. Five members of the senior resident staff, including the author, have performed the deliveries. The good results quoted are attributed almost in their entirety to the form of anaesthesia used, which results in a delivery approximating the normal mechanism.

#### Summary of Clinical Details.

Breech delivery was performed on *primipara* in 33 cases; the results may be stated briefly as follows:

**Type of Anaesthesia:** Pudendal block and perineal infiltration, 30 cases; caudal analgesia,<sup>1</sup> 3 cases; supplemental, 4 cases.

#### Duration of Labour:

First stage: maximum 37 hours, minimum 3 hours 35 minutes, average 13 hours 35 minutes.

Second stage: maximum 4 hours 35 minutes, minimum 20 minutes, average 1 hour 26 minutes.

<sup>1</sup> I have included three cases in which caudal analgesia was used. In two of these, instead of a pudendal block and perineal infiltration, eight millilitres of 1.5% solution of "Metycaine" were injected into the caudal canal by the standard technique. The perineal and vaginal anaesthesia obtained was maximal.

Third stage: maximum 1 hour 45 minutes, minimum 5 minutes, average 20 minutes.

**Types of Breech:** Frank breech, 18 cases; extended arms, 11 cases; extended head, 2 cases.

**Weight of Babies:** Average, 6 pounds nine ounces; heaviest, 8 pounds 8 ounces; lightest, 5 pounds 2 ounces.

**Post-Partum Haemorrhage:** Post-partum haemorrhage occurred in three cases, one associated with a lacerated cervix, one with an adherent placenta which required manual removal and one with an atonic uterus.

**Condition of Babies:** All babies lived; two had *asphyxia pallida*, but all were discharged well.

**Method of Delivery of the Head:** Forceps, 3 cases; burns, 2 cases; Smellie-Veit, 28 cases.

**Puerperium:** The puerperium was abnormal in three cases owing to faulty healing of episiotomies. One morbid puerperium occurred following manual removal.

#### Conclusions.

1. Pudendal block and perineal infiltration is a safe method for both mother and child of delivery in uncomplicated breech presentation in a *primipara*.

2. Post-partum bleeding is minimal.

3. There is no untoward influence on the second or third stage of labour.

TABLE I.  
Breech Deliveries in Primipara under Local Anaesthesia (Except where Otherwise Indicated).

Case Number.	Duration of Labour.			Post-partum haemorrhage.	Baby Weight.	Baby's Condition.	Puerperium (Days.)	Sepsis.	Episiotomy.	Supplementary Anaesthesia.	Complication of Breech.	Head Delivered.
	1st Stage.	2nd Stage.	3rd Stage.									
46/5940	h. m. 13 30	h. m. 1 55	h. m. 0 15	NIL.	lb. oz. 8 0	Very good.	9	Endometritis.	Yes.	NIL.	Extended arms.	Smellie-Veit.
46/5305	9 30	1 10	0 35	NIL.	7 0	Very good.	9	NIL.	Yes.	NIL.	Frank.	Smellie-Veit.
46/593	3 35	1 00	0 10	NIL.	9 0	Very good.	9	NIL.	Yes.	NIL.	Frank.	Smellie-Veit.
46/761	20 00	2 00	0 20	NIL.	7 12	Very good.	9	NIL.	No.	NIL.	Full.	Smellie-Veit.
46/806	4 45	2 00	0 30	NIL.	7 14½	Very good.	10*	NIL.	Yes.	NIL.	Frank.	Smellie-Veit.
46/1344	11 30	2 15	0 25	NIL.	6 14½	Very good.	9	NIL.	Yes.	NIL.	Frank.	Forceps.
46/1285	6 00	1 40	0 15	NIL.	7 00	Very good.	17	Breasts.	Yes.	Light chloroform.	Full.	Smellie-Veit.
46/1346	12 00	1 30	0 25	Yes. <sup>1</sup>	9 2	Very good.	15	NIL.	Yes.	NIL.	Full. Extended arms.	Smellie-Veit.
46/2290	7 00	1 35	0 20	NIL.	7 10½	Good.	14	NIL.	Yes.	NIL.	Footling. Extended arms.	Smellie-Veit.
46/3022	3 45	1 30	0 15	NIL.	5 9	Good.	9	NIL.	Yes.	NIL.	Full.	Smellie-Veit.
46/3195	19 50	0 40	0 15	NIL.	8 8	Poor.	8	NIL.	Yes.	NIL.	Full.	Smellie-Veit.
46/3312	7 5	1 00	0 10	NIL.	7 12½	Good.	10	NIL.	Yes.	NIL.	Frank.	Smellie-Veit.
46/3470	5 25	0 20	0 20	NIL.	6 4½	Good.	19	Breasts.	Yes.	NIL.	Full. Extended arms.	Smellie-Veit.
46/3627	10 00	0 40	0 20	8 ounces.	5 13	<i>Asphyxia livida.</i>	18	NIL.	Yes.	NIL.	Frank.	Smellie-Veit.
46/4931	3 45	0 30	0 15	NIL.	5 9	Good.	10	NIL.	Yes.	NIL.	Footling.	Smellie-Veit.
46/4917	37 00	1 50	0 20	NIL.	7 1	Good.	11	NIL.	Yes.	NIL.	Frank.	Smellie-Veit.
46/5520	41 00	1 15	1 45	30 ounces.*	8 1½	Good.	11	Hæmolytic streptococcus.	Yes.	NIL.	Frank. Extended arms.	Smellie-Veit.
46/5684	23 00	0 40	0 5	NIL.	6 6	Good.	9	NIL.	Yes.	NIL.	Frank.	Smellie-Veit.
46/6239	24 55	4 35	0 15	NIL.	7 6	Good.	7	NIL.	Yes.	NIL.	Frank. Nuchal arms.	Smellie-Veit.
46/6290 <sup>1</sup>	14 00	1 10	0 05	NIL.	7 1	Good.	12	NIL.	Yes.	NIL.	Extended arms.	Smellie-Veit.
46/6339	11 30	1 00	0 15	NIL.	7 7	Good.	9	NIL.	Yes.	NIL.	Extended head.	Forceps to head.
46/6620	4 00	1 15	0 30	NIL.	6 10	Fair.	10	NIL.	Yes.	NIL.	Frank.	Smellie-Veit. Difficult.
46/6822 <sup>1</sup>	13 20	1 10	0 10	NIL.	7 13	Good.	10	NIL.	Yes.	NIL.	Frank. Extended arms and head.	Forceps to head.
46/7059	10 55	0 30	0 30	NIL.	6 0½	Good.	12	Breasts.	Yes.	NIL.	Frank.	Burns method.
46/7250*	5 45	0 30	0 5	NIL.	5 15	Good.	10	NIL.	Yes.	NIL.	Frank.	Burns method.
46/5938	22 20	2 30	0 25	NIL.	5 13	Good.	13*	NIL.	Yes.	NIL.	Frank.	Smellie-Veit.
46/5012	12 30	2 10	0 35	NIL.	7 8	Good.	21	NIL.	Yes.	Chloroform.	Anterior leg astride symphysis.	Smellie-Veit.
45/5005	12 15	1 00	0 15	Yes. Atonic uterus.	5 2	Limp. Cephal-hæmatoma.	17	NIL.	Yes.	NIL.	Frank.	Smellie-Veit.
45/4740	10-15	0 55	0 30	NIL.	7 1	Very good.	10	NIL.	Yes.	NIL.	Frank.	Smellie-Veit.
45/4395	36 5	1 15	0 15	NIL.	7 4	Good.	32*	NIL.	Yes.	Chloroform.	Extended arms.	Smellie-Veit.
45/4178	16 30	2 20	0 40	NIL.	6 4	Good.	17*	NIL.	Yes.	NIL.	Full.	Smellie-Veit.
47/1560	—	—	0 5	NIL.	6 14	Good.	9	NIL.	Yes.	Chloroform.	Full. Extended arms.	Smellie-Veit.
47/606	11 40	1 50	0 15	NIL.	7 4	Good.	10	NIL.	Yes.	NIL.	Frank.	Smellie-Veit.
Average	13 35	1 26	0 20		6 9							

<sup>1</sup> Caudal anaesthesia.

\* Low caudal anaesthesia.

\* Patient left hospital at own request.

\* Delayed healing of perineum.

\* Trauma to the cervix.

\* Manual removal of placenta carried out, followed by blood transfusion.



4. This method of anaesthesia can be extended to all cases in which general anaesthesia is contraindicated for delivery and to the delivery of premature babies.

#### LOCAL INFILTRATION ANAESTHESIA IN CAESAREAN SECTION.

##### Anatomy.

The anterior abdominal wall is supplied by the anterior and lateral divisions of the lower six intercostal nerves, the ilio-hypogastric, and ilio-inguinal nerves. The nerve supply to the uterus for the pains of contractions comes via the sympathetic nervous system from the tenth, eleventh and twelfth thoracic segments. The uterus and its visceral peritoneum are insensitive to incision. The

the abdomen for the same distance and down to the inferior weal in the midline. Injections from this lower weal are radiated towards the twelfth rib, transversely across the abdomen towards the anterior superior iliac spine and down to the *symphysis pubis*. Special care is taken to make the injection completely down to the symphysis, as pain may later be experienced when a retractor is inserted, if insufficient anaesthetic material is used. When the incision is made and the rectus sheath exposed, it is advisable to infiltrate the anterior wall of the sheath and abdominal wall between the transverse abdominal and internal oblique muscles in the same manner as the superficial injections. The transversalis fascia generally needs infiltration and at this stage it is

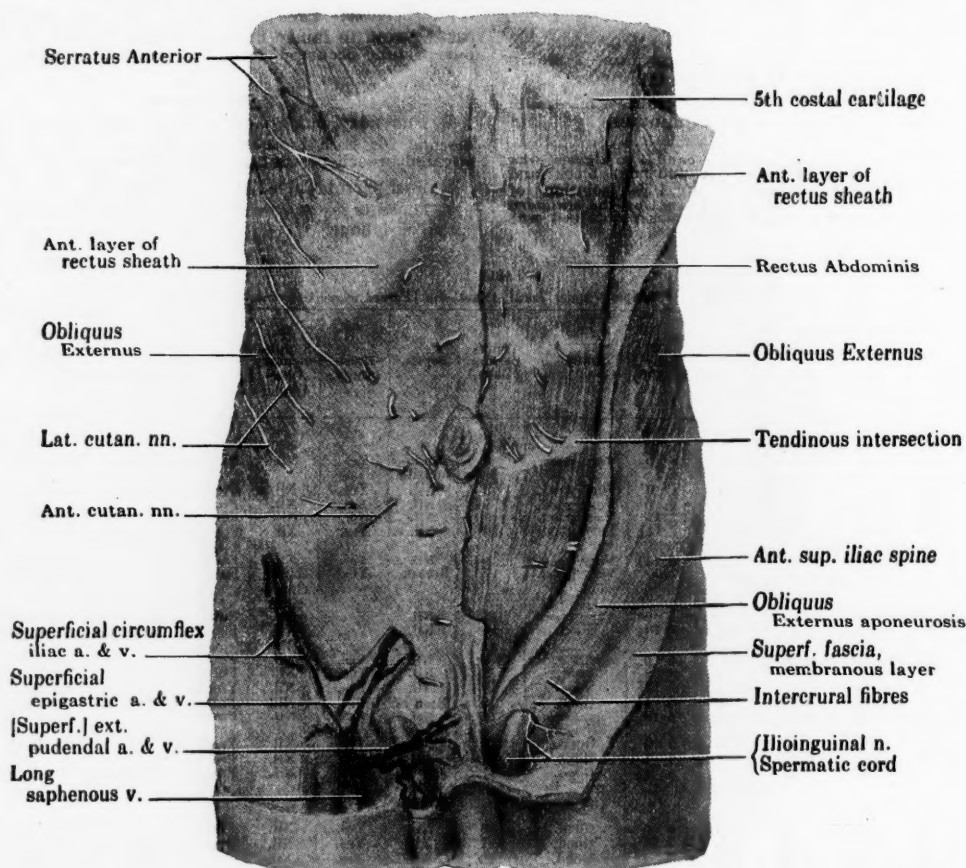


FIGURE III.—The anterior abdominal wall: the anterior layer of the left rectus sheath is reflected (Grant's "Atlas of Anatomy", Figure 68). The superficial branches of the anterior and lateral divisions of intercostal nerves are shown.

practical points to remember are that the thoracic nerves enter the abdominal wall at the margin of the costal arch and then run downwards and medially between the internal oblique and transverse abdominal muscles to enter the sheath of the rectus. The ilio-hypogastric and ilio-inguinal nerves run forwards close to the crest of the ilium. (See Figures III and IV.)

##### Technique.

Two small skin weals are made, one about two centimetres below the umbilicus and the other midway between the umbilicus and the *symphysis pubis*. From the upper weal radiating injections are made on each side towards the tip of the ninth costal cartilage for a distance of almost 4.5 inches (the length of the needle), transversely across

advisable to inject a further five to ten millilitres in the retropubic area. When the peritoneum has been opened an extraperitoneal injection in the radiate directions is made. This has the effect of anaesthetizing the peritoneum, which greatly facilitates cleansing operations and removal of blood clot. In the great majority of cases, that is all the infiltration needed. The uterus and visceral peritoneum do not need to be infiltrated—the only advantage in doing so being that the visceral layer of peritoneum in the lower segment operation becomes more easily separated and any anaesthetic defect is corrected.

##### Disadvantages.

It was thought at first that the patients would object to the ordeal and become uncooperative and difficult.

This was not so and it is a rare occasion for a patient to misbehave. Heavy sedation is completely contraindicated and should be replaced by a talk to the patient, a full explanation of what is going to happen and the utmost reassurance. The presence of multiple adhesions in the peritoneal cavity would deter the operator who is using local anaesthesia for the first time, but these are not insuperable.

Two factors, however, can make the operation difficult—firstly, a head which is tightly wedged in the pelvis or pelvic brim and, secondly, blood clot in the peritoneal

wall, and also the "peritoneal toilet" can be performed with ease. If no supplementary anaesthesia is used, morphine (one-quarter of a grain) is given to the patient when the foetus is removed from the uterus.

#### Advantages.

##### Maternal.

The mother is spared the disadvantages of general anaesthesia with its resultant vomiting and strain. She is a very satisfied patient who returns to the ward and is able to have a cup of tea. Bleeding during the operation

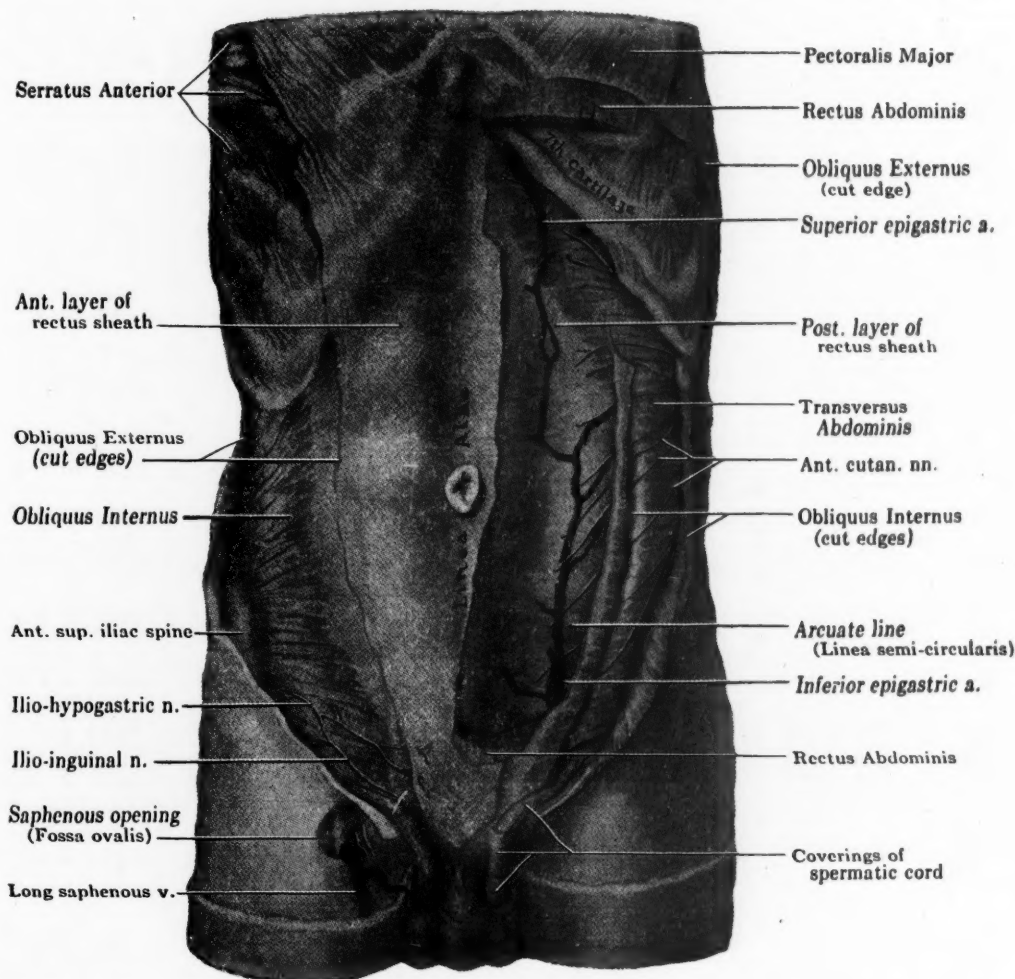


FIGURE IV.—The anterior abdominal wall: on the right, part of the obliquus externus is excised; on the left, the rectus abdominis is excised and the obliquus internus divided (Grant's "Atlas of Anatomy", Figure 69). The site of entrance of the cutaneous nerves into the rectus sheath is well shown. Also the contribution of the ilio-hypogastric and ilio-inguinal nerves to the sensory supply of the abdominal wall.

cavity which requires to be removed. Manipulations to extract the head may cause pain and the removal of clot from portions of the peritoneal cavity which are not anesthetized will cause the patient to react violently. Hence it is better to supplement the local anaesthesia with an intravenous anaesthetic agent such as "Pentothal" at the time the incision in the uterus is made. As a rule at the Women's Hospital, arrangements are made in all Caesarean sections for supplementary "Pentothal" to be given—on many occasions it is not necessary. The foetus is removed before the general anaesthetic can act upon it and the suturing of uterus, peritoneum, and abdominal

and post-operatively is minimal as uterine contractions are not inhibited, and statistics show a shortened convalescence with minimal post-operative discomforts.

##### Foetal.

One of the most satisfying events in a Caesarean section under local anaesthesia is the lusty cry of the baby immediately upon extraction from the uterus. The foetus has its full complement of oxygen, none of which has been displaced by gaseous anaesthetics or depressants soluble in maternal and foetal plasma. This fact has saved many a foetus from perishing in the neonatal period from the

TABLE II.  
Caesarean Section Performed under Local Anesthesia.

Case Number.	Indications.	Type of Local Anesthesia.	Supplementary Anesthesia.	Condition of Baby.	Condition of Mother.	Blood Loss.	Puerperium.	Baby's Weight.	Time for Operation.	Type of Operation.	Remarks.
45/4038	Severe pre-eclampsia.	L.I. <sup>1</sup>	Nil.	Very good.	Very good.	Minimal.	20 days. Hypertension.	lb. oz.	Minutes.	Classical.	Emergency admission.
45/3220	Placenta previa.	L.I.	Nil.	Very good.	Very good.	Minimal.	19 days. Mild pyrexia.	2 13	45	Classical.	
46/3678	Placenta previa. Mitral stenosis. Cardiac failure.	L.I.	Nil.	Stillborn.	Fair.	Minimal.	Died in 24 days. Cardiac failure.	8 6	35	L.S.C.S.*	Baby discharged at five months. Sterilization.
45/3105	Disproportion.	L.I.	Nil.	Twisting.	Very good.	Moderate	20 days. Normal.	—	50	L.S.C.S.	
45/3011	Severe essential hypertension.	L.I.	Ether.	? Cerebral oedema.	Very good.	from venous sinuses.	20 days. Blood transfusion.	5 3	N.R.	L.S.C.S.	
45/4460	Disproportion.	L.I.	"Pentothal," Gas and oxygen.	Good.	Very good.	Minimal.	22 days. Normal.	7 2	N.R.	Classical.	Sterilization.
45/5333	Disproportion.	L.I.	"Pentothal," Gas and oxygen.	Good.	Good.	Minimal.	16 days. Normal.	6 44	60	L.S.C.S.	
45/5433	Disproportion.	L.I.	"Pentothal," Nil.	Good.	Good.	Minimal.	20 days. Normal.	7 10	N.R.	L.S.C.S.	Baby lived six hours. Erythroblastosis.
45/5451	Fetal erythroblastosis.	L.I.	Nil.	Living, but oedematous.	Good.	Minimal.	23 days. Normal.	—	40	Classical.	Myomectomy performed.
45/5455	Severe hypertension.	L.I.	Gas and oxygen.	Good.	Good.	Minimal.	20 days. Mild sepsis due to ruptured membranes for three days.	5 10	50	L.S.C.S.	
45/5553	Placenta previa.	L.I.	"Pentothal," Nil.	Very good.	Very good.	Minimal.	17 days. Mild pyrexia.	6 10	90	L.S.C.S.	Patient made excellent recovery. Sterilization.
45/5610	Pyelitis and anuria.	L.I.	Nil.	Very good.	Fair.	Minimal.	23 days. Well.	4 15	45	Classical.	
45/5691	Disproportion.	L.I.	Nil.	Very good.	Very good.	Minimal.	23 days. Well.	9 2	80	Classical.	
45/5692	Deformed pelvis. Frank breech.	L.I.	Nil.	Very good.	Very good.	Minimal.	25 days. Premature baby.	4 13	35	Classical.	
47/294	Same as 45/5692.	L.I.	"Pentothal," Nil.	Very good.	Very good.	Minimal.	16 days. Normal.	9 9	N.R.	L.S.C.S.	Sterilization.
45/6046	Disproportion.	L.I.	"Pentothal," Nil.	Very good.	Very good.	Minimal.	17 days. Well.	9 2	45	L.S.C.S.	Baby collapsed five minutes after delivery. Post mortem: Aortic aneurysm. Sterilization.
45/6446	Previous Caesarean section. Ruptured membranes.	L.I.	"Pentothal," Nil.	Fair to good.	Very good.	Minimal.	19 days. Well.	4 12	N.R.	L.S.C.S.	
45/6541	Previous Caesarean section.	L.I.	Nil.	Very good.	Very good.	Minimal.	25 days.	7 14	90	L.S.C.S.	
46/162	Disproportion.	L.I.	Nil.	Very good.	Very good.	Moderate. Placenta difficult to remove.	21 days. Normal.	9 4	45	Classical.	
46/569	Disproportion.	Caudal.	Nil.	Pale. Cord hemorrhaged. Tissue well.	Very good.	Minimal.	17 days. Slight pyrexia.	7 8	N.R.	Classical.	Baby well on discharge.
46/982	Previous Caesarean section.	L.I.	Ether.	Very good.	Very good.	Minimal.	18 days. Normal.	9 2	65	Classical.	Sterilization. Repair of hernia.
46/1295	Placenta previa and twins.	L.I.	Nil.	Well.	Transfusion on table.	Minimal.	22 days. Normal.	7 1	N.R.	Classical.	Shock when uterus emptied. Sterilization.
Inter./1794	Previous Caesarean section.	L.I.	Nil.	Very good.	Very good.	Minimal.	7 days. Normal.	9 2	50	L.S.C.S.	
46/2220	Disproportion.	L.I.	Nil.	Very good.	Very good.	Minimal.	19 days. Normal.	7 14	N.R.	L.S.C.S.	
46/2799	Primitipara. Breech. Oblique inertia.	L.I.	Nil.	Very good.	Very good.	Minimal.	15 days. Normal.	5 14	60	L.S.C.S.	
46/2800	Disproportion.	L.I.	Nil.	Very good.	Very good.	Minimal.	18 days. Normal.	7 8	N.R.	L.S.C.S.	
46/2835	Disproportion.	L.I.	Nil.	Very good.	Very good.	Minimal.	15 days. Normal.	7 5	60	L.S.C.S.	
46/3184	Severe pre-eclampsia.	L.I.	Nil.	Fair/good.	Very good.	Moderate.	22 days. Normal.	6 44	N.R.	Classical.	
46/1575	Severe essential hypertension.	L.I.	Nil.	Very good.	Very good.	Minimal.	33 days. Hypertension.	5 7	N.R.	L.S.C.S.	
46/3631	Old primipara.	L.I.	"Pentothal," Nil.	Poor.	Good.	Minimal.	20 days. Normal.	4 7	N.R.	Classical.	Baby died 14 hours after operation. Post mortem: Aneurysm.
46/3683	Disproportion.	L.I.	Nil.	Very good.	Very good.	Minimal.	20 days. Normal.	7 14	N.R.	L.S.C.S.	
46/3682	Disproportion.	L.I.	"Pentothal," Nil.	Very good.	Very good.	Minimal.	18 days. Normal.	6 134	60	L.S.C.S.	
46/4501	Placenta previa.	L.I.	Nil.	Very good.	Very good.	Minimal.	23 days. Mild pyrexia.	6 04	N.R.	Classical.	Uterine prolapse in puerperium.
46/4576	Severe pre-eclampsia. Severe pre-eclampsia.	L.I.	Nil.	Very good.	Very good.	Minimal.	27 days. Pyrexia and hypertension.	3 14	45	Classical.	
46/4610	Pre-eclampsia.	L.I.	Nil.	Very good.	Very good.	Minimal.	27 days. Hypertension.	7 1	55	Classical.	Myomectomy performed.
46/4624	Elderly primipara. Pre-eclampsia. Small pelvis.	L.I.	Nil.	Very good.	Very good.	Minimal.	23 days. Normal.	7 4	N.R.	L.S.C.S.	
46/5539	Elderly primipara. Inertia.	L.I.	Nil.	Very good.	Very good.	Minimal.	26 days. Distension.	8 44	N.R.	L.S.C.S.	
46/6406	Elderly primipara. Hyper-tension.	L.I.	Nil.	Very good.	Very good.	Minimal.	20 days. Normal.	4 144	75	L.S.C.S.	

<sup>1</sup> L.I. = Local infiltration.

\* N.R. = Not recorded.

\* L.S.C.S. = Lower segment Caesarean section.



TABLE II.—Continued.  
Caesarean Section Performed under Local Anæsthesia.—Continued.

Case Number.	Indications.	Type of Local Anæsthesia.	Supplementary Anæsthesia.	Condition of Baby.	Condition of Mother.	Blood Loss.	Puerperium.	Baby's Weight.	Time of Operation.	Type of Operation.	Remarks.
46/6480	Small pelvis. Frank breech.	L.I.	Nil.	"Mucousy" but good.	Very good.	Minimal.	20 days. Normal.	1b. oz. 7 14	Minutes. N.R.	Classical.	
46/6527	Previous trachelorrhaphy.	L.I.	Nil.	Very good.	Very good.	Minimal.	19 days. Normal.	9 7	N.R.	L.S.C.S.	Sterilization.
46/6660	Disproportion. Previous Caesarean section.	Caudal.	Nil.	Very good.	Very good.	Minimal.	20 days. Normal.	8 14	N.R.	Classical.	
46/7677	Elderly primipara. Fetal distress.	L.I.	Nil.	Very good.	Very good.	Minimal.	19 days. Normal.	6 24	N.R.	L.S.C.S.	
46/7106	Elderly primipara. Toxæmia.	L.I.	Nil.	Very good.	Very good.	Minimal.	19 days. Normal.	6 0	60	L.S.C.S.	
46/7339	Breech. Placenta prævia.	L.I.	"Pentothal."	Very good.	Very good.	Minimal.	22 days. Distension.	5 64	N.R.	Classical.	Pre- and post-operative transfusion. Blood transfusion before operation.
47/783	Placenta prævia.	L.I.	"Pentothal."	Very good.	Very good.	Minimal.	21 days. Well.	5 14	75	Classical.	Baby slightly lethargic.
47/689	Disproportion.	L.I.	"Pentothal."	Very good.	Very good.	Minimal.	19 days. Pyrexia once.	6 4	85	L.S.C.S.	
47/1218	Disproportion.	L.I.	"Pentothal."	Very good.	Very good.	Minimal.	18 days. N.R.	5 10	60	L.S.C.S.	
47/923	Placenta prævia.	L.I.	"Pentothal."	Very good.	Very good.	Minimal.	18 days. Metritis.	5 1	N.R.	Classical.	Pre-operative transfusion.
47/466	Atresia of cervix.	L.I.	Chloroform.	Very good.	Fair.	Moderate.	22 days. Complicated.	5 9	N.R.	Combined.	Hæmorrhage on fourth day. Hysterectomy. Salpingectomy.
47/1339	Disproportion. Previous Caesarean section.	L.I.	"Pentothal."	Very good.	Very good.	Minimal.	15 days. Normal.	7 3	N.R.	L.S.C.S.	
47/1320	Disproportion.	L.I.	Nil.	Very good.	Very good.	Minimal.	16 days. Normal.	6 54	75	L.S.C.S.	
47/900	Disproportion. Previous Caesarean section.	L.I.	Nil.	Very good.	Very good.	Minimal.	21 days. Normal.	8 3	60	L.S.C.S.	
47/799	Placenta prævia.	L.I.	Nil.	Poor.	Very good.	Minimal.	16 days. Normal.	2 9	85	Classical.	Baby died on third day. Anoxæmia.

\* L.S.C.S. = Lower segment Caesarean section.

\* N.R. = Not recorded.

\* L.I. = Local infiltration.

effects of intrauterine anoxæmia, itself the result of the indication precipitating the Caesarean section and aggravated further by general anæsthesia. I, personally, am in favour of local anæsthesia for all Caesarean sections, but where fetal anoxæmia is present or anticipated as in ante-partum hæmorrhage it should be regarded as a necessity.

#### Results.

I present herewith the statistics for Caesarean section performed under local anæsthesia since 1944. (Table II.)

#### Summary of Clinical Details.

Caesarean section was performed in 53 cases and the results may be briefly stated as follows.

**Anæsthesia Used:** Local infiltration alone, 32 cases; local infiltration plus "Pentothal", 13 cases; local infiltration plus gas and oxygen, 2 cases; local infiltration plus ether, 2 cases; local infiltration plus chloroform, 1 case; caudal, 3 cases.

**Post-operative Maternal Condition:** The post-operative condition of the mother was good in 49 cases, but complications occurred in four cases. The following are the details of the complications.

**CASE 45/3678.**—The patient was admitted in a state of emergency with a central *placenta prævia* and suffering from mitral stenosis with cardiac failure. She was delivered of a stillborn baby by Caesarean section under local infiltration anæsthesia. The mother developed auricular fibrillation and died on the twenty-fourth day after operation.

**CASE 45/5610.**—The mother was suffering from severe pyelitis and her pre-operative condition was poor. She recovered completely after Caesarean section was performed.

**CASE 46/1295.**—A twin pregnancy was further complicated by the presence of *placenta prævia*. "Obstetric shock" occurred when the uterus was emptied at Caesarean section; a blood transfusion was administered and the patient made an uneventful recovery.

**CASE 47/466.**—The patient was suffering from atresia of the cervix and Caesarean section was undertaken. The fetal head was well engaged and difficulty was experienced in removing it from the pelvis; a vertical as well as a transverse incision was made into the uterus. Hysterectomy was performed on the fourth day after operation because of paravascular hæmorrhage.

**Complications During the Puerperium:** During the puerperium, one death occurred (see Case 45/3678 above); eight patients exhibited mild pyrexia and two patients suffered from severe post-operative distension, from which, however, they recovered.

**Results to the Baby:** Five babies died and 49 babies were in good condition when born and cried lustily. Two of the deaths occurred in association with *placenta prævia*; at post-mortem examination a state of anoxæmia was found in both cases; one infant weighed two pounds nine ounces and the other four pounds seven ounces. One baby was stillborn (Case 45/3678). In Case 45/6446 Caesarean section was performed because of previous Caesarean section and the presence of ruptured membranes; the baby weighed four pounds twelve ounces and collapsed five minutes after delivery; a state of atelectasis was found at autopsy. In Case 45/5451 Caesarean section was performed because of a diagnosis of *erythroblastosis fetalis*; blood transfusion was administered, but the infant lived for only six hours.

When the existence of the fœtus was not complicated by conditions such as *placenta prævia*, hæmolytic disease, chances of survival were 98%. In the *placenta prævia* group (11 cases) three babies died, that is, 27% mortality.

**Blood Loss at Operation:** Bleeding was in excess of a minimal amount in four cases. In one case it was due to large uterine sinuses; one placenta was difficult to remove (*placenta prævia*); one patient had severe preeclampsia; in the fourth case the head was difficult to dislodge from the pelvis and the uterus required a vertical as well as a transverse incision. If cases of *placenta prævia* are excluded, only one patient required a post-operative transfusion (Case 47/466) and she had to undergo hysterectomy on the fourth day because of post-operative hæmorrhage.

**Type of Operation:** The lower segment operation was performed in 29 cases, the classical in 22 cases, and the combined in two cases.

**Duration of Operation:** Among 28 operations recorded the average time taken was sixty minutes. The minimum time taken was thirty-five minutes and the maximum ninety minutes (twice).

**Other Operations:** Eight patients were sterilized at the same time and had normal convalescence. Two underwent myomectomy, in addition, with slightly prolonged convalescent times.

**Length of Puerperium:** The puerperium averaged 20.3 days in length; the shortest was fifteen days and the longest thirty-three days. Thirty-three patients, or 62%, were in hospital for twenty days or less following operation.

#### Conclusions.

1. Local anaesthesia, particularly local infiltration supplemented with intravenous administration of "Pentothal", is a safe anaesthetic for the mother.
2. Maternal operative and post-operative complications are less.
3. Haemorrhage from the uterus due to the operation is greatly reduced.
4. The convalescence is shortened.
5. Wound healing is normal.
6. With a head deeply engaged in the pelvis, supplementary anaesthesia must be given.
7. Both the lower segment and classical operations can be performed with this type of anaesthesia.
8. There is no anaesthetic risk to the baby.
9. Premature and anoxæmic babies stand a better chance of survival.

#### ACKNOWLEDGEMENTS.

I wish to express my thanks to the honorary medical staff of the Women's Hospital, Crown Street, for their permission to use their cases in this report, and I am also indebted to the members of the resident medical staff, particularly Dr. Holman, Dr. Humphrey, Dr. McMahon, Dr. Hamlin and Dr. Jasper, for their work on breech deliveries.

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### FAILURE OF THE CLOTTING MECHANISM DURING ABNORMAL LABOUR, WITH A DISCUSSION OF THE POSSIBLE CAUSES.

By B. J. BASIL-JONES,

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DANGEROUSLY profuse hæmorrhage is all too common in obstetrical practice, and failure of blood coagulation may not infrequently be associated. However, since this can seldom be demonstrated, such an association encountered in a patient at the Royal Hospital for Women, Paddington, seemed to be sufficiently unusual to warrant reporting.

#### Report of a Case.

Q.B., aged twenty-six years, pregnant for the sixth time, was admitted to hospital at 11.30 p.m. on January 21, 1946. Due to be confined in April, 1946, she had commenced suddenly to have hæmorrhage *per vaginam* one hour and three-quarters earlier that same evening. Examination revealed a very slight flow of dark blood; the uterus was found to be enlarged to the size of a twenty-eight weeks' gestation and was not tender.

Hæmorrhage had ceased next morning, January 22. The foetal heart sounds were audible. The systolic blood pressure was 120 millimetres of mercury and the diastolic 68 millimetres. Microscopic and cultural examination of the urine revealed no abnormality; the urine contained no albumin. The blood urea content was 13 milligrammes per 100 millil-

litres, the blood uric acid level was 3.75 milligrammes per 100 millilitres. X-ray examination showed that a six and a half months' fetus was lying transversely and relatively high in the abdomen. The blood was found to belong to group O and to be Rh-positive. Whole blood, which was collected at this time to provide serum for "cross-matching" tests, clotted in an apparently normal manner.

The patient remained free from symptoms and abnormal signs for the next five days. At 4.30 a.m. on January 28 profuse hæmorrhage *per vaginam* began. Pelvic examination revealed that the placenta was encroaching upon the internal cervical os, but the examining finger could be passed above its edge. Under general anaesthesia, the membranes were ruptured, bipolar version was performed, a foot was brought down and traction was applied to the half breech. For the moment hæmorrhage was controlled, and the patient's condition was stated to be fair at the conclusion of the operation.

Owing to the lapse of time since collection of the previous sample of blood for "cross-matching" tests, a further five to ten millilitres were removed from a vein with a sterile syringe and placed in a sterile dry test tube without any anticoagulant. This blood did not clot at any stage during the next three days.

Because of this abnormality, further examinations were performed. The hæmoglobin value was found to be 13.3 grammes per 100 millilitres, platelets were present in a blood film in normal numbers, although they seemed somewhat larger than usual, and the bleeding time estimated by Duke's method was seven minutes eight seconds (normal, up to three minutes); measurement of the coagulation time by Gibbs's method (normal range, one and a half to two minutes) was abandoned when no coagulation had occurred after fourteen minutes. The patient was given subcutaneously two millilitres of "Synkamine" (two milligrammes of 4-amino-2-methyl-1-naphthol as the hydrochloride, water soluble vitamin K<sub>3</sub>), and this dose was repeated twice at intervals of four hours.

At 2 p.m. on January 28 the second stage of labour began, and a further considerable loss of blood from the vagina occurred. The systolic blood pressure was 94 millimetres of mercury, the diastolic pressure 60 millimetres of mercury. The intravenous administration of pooled human serum was begun. At 2.25 p.m. a stillborn male fetus (weight two pounds ten and a quarter ounces) was expelled.

At 2.30 p.m. the ragged and broken placenta was removed manually under general anaesthesia. The pulse rate was then 120 per minute, the systolic blood pressure 90 millimetres of mercury and the diastolic pressure 46 millimetres. In addition to the serum, transfusion of citrated blood by another vein had been begun. Hæmorrhage from the vagina decreased gradually during the next two hours and a half. At 7.30 p.m. the blood transfusion was completed; the patient's condition was considerably improved, and the systolic blood pressure was 108 millimetres of mercury and the diastolic pressure 68 millimetres; 2550 millilitres of citrated blood and 1000 millilitres of pooled human serum had been administered. As the temperature had been raised above 103° F. during and after the labour, penicillin therapy was commenced.

On January 30, two days after the confinement, examination of the blood showed that the erythrocytes numbered 3,840,000 per cubic millimetre, the leucocytes totalled 14,900 per cubic millimetre, and the hæmoglobin value was 10.5 grammes per 100 millilitres; the bleeding time was now one minute forty seconds and the coagulation time two minutes forty seconds.

An estimation was made on February 8 of the patient's ability to excrete hippuric acid after the ingestion of four grammes of sodium benzoate; this was 2.3 grammes in four hours—equivalent to 77% of normal excretion. On February 15 the prothrombin level of the patient's plasma was calculated to be 81% of normal.

The high temperature, which began on January 28, continued for five days and then fell to about 99° F., finally reaching normal on February 16. Culture of the lochia on January 29 yielded members of the *Bacillus coli* communis, *Bacillus aerogenes* group and hemolytic *Staphylococcus albus*; an attempt at culture of blood collected on February 1 yielded no growth after incubation for eleven days. Penicillin therapy was suspended on February 4. A hæmatoma in the right antecubital fossa delayed convalescence, but it eventually resolved and the patient was discharged from hospital on February 26, twenty-eight days after confinement.

#### Discussion.

When one is confronted with a failure of coagulation such as that described above, it is desirable to examine each constituent of the blood concerned in the process of

clotting from qualitative and quantitative aspects. Unfortunately it was not possible to do so in this case; however, it seems pertinent to review briefly the circumstances which may inhibit coagulation.

It is now generally held that coagulation involves two distinct and consecutive reactions. The first is the formation of an active coagulant, thrombin, by the interaction of prothrombin, ionized calcium and thromboplastin. The second is the interaction between thrombin and fibrinogen to form fibrin. These reactions are commonly expressed by the following equations: prothrombin + ionized calcium + thromboplastin = thrombin; thrombin + fibrinogen = fibrin.

Clotting of blood may be impaired by (i) diminished prothrombin content, (ii) diminished calcium ions, (iii) deficient thromboplastin, (iv) excess of anti-thrombin (or anti-prothrombin), (v) diminished fibrinogen content, (vi) possible absence of "Factor V", (vii) possible fibrinolysis.

#### *Diminished Prothrombin Content.*

The plasma prothrombin content is lowered in (a) vitamin K deficiency, (b) hepatic disease, (c) "Dicumarol" therapy, (d) salicylate therapy, (e) idiopathic hypoprothrombinemia.

Shortage of vitamin K in humans is seldom of dietary origin, since the intestinal bacteria appear to be able to synthesize it. However, administration of sulphaguanidine and sulphasuxidine may so reduce the intestinal flora that this synthesis is arrested. It is thought that it is prior to the development of intestinal bacteria in the newborn that "physiological" hypoprothrombinemia and hemorrhagic disease occur. For the absorption of fat-soluble vitamin K from the intestine bile salts are necessary, and these will not be available in biliary obstruction or fistula; this absorption may be imperfect in sprue and in ulcerative colitis also.

In liver disease hypoprothrombinemia sometimes occurs from the failure of the liver to convert vitamin K (present in adequate quantity) to prothrombin.

Cattle fed spoiled sweet-clover hay develop a hemorrhagic disease characterized by a low prothrombin content of the blood. The toxic principle in the hay, a coumarin compound, has been isolated and synthesized. The synthetic product, called "Dicumarol", is taking an important place in therapeutics in the prevention of intravascular thrombosis.

Administration of salicylates in very large doses produces hypoprothrombinemia; the action of the drugs is thought to be essentially the same as that of "Dicumarol", but less powerful.

The term "idiopathic hypoprothrombinemia" has been applied to a few cases in which the prothrombin level is greatly reduced in the apparent absence of any of the accepted causes. With regard to this factor, it is important to remember that Quick has stated that coagulation is not impaired until the prothrombin concentration of the plasma is reduced to about 20% of the normal level.

#### *Diminished Calcium Ions.*

Delayed clotting can rarely be attributed to calcium deficiency, for marked prolongation of the coagulation time appears only when the blood calcium content is reduced to 2.5 milligrammes *per centum* or less. Hypocalcemia may conceivably cause a continued state of coagulation failure, but it is difficult to visualize its giving rise to a transient state.

#### *Deficient Thromboplastin.*

Adequate thromboplastin may not be available in: (a) thrombocytopenia, (b) qualitative platelet deficiency, (c) deficient "plasma thromboplastin", (d) excess of anti-thromboplastin in the plasma, (e) heparin inhibition of platelet agglutination.

Whilst thrombocytopenia (primary or secondary to intoxication, sepsis or other blood disorder) is known to cause prolongation of the bleeding time and failure of clot retraction, there is evidence that a profound reduction in the number of platelets will delay coagulation also.

With regard to qualitative platelet deficiency, one theory to explain the delayed coagulation of hæmophilia is that the platelets are less sticky and break up less readily than those of normal blood; this abnormal stability of the platelets is thought to cause an inadequate yield of thromboplastin. More recently, however, it has been shown that normal blood contains a substance "plasma thromboplastin", which is absent or greatly reduced in hæmophilic plasma; transfusion of normal blood or of plasma free from platelets will greatly shorten the coagulation time of a hæmophilic.

A third theory is that in hæmophilia there exists an excess of "anti-thromboplastin". This is the name given to the substance or substances which, when incubated with normal plasma, are able to destroy or inactivate thromboplastin. Recently Fantl and Nance have described the case of a female patient suffering from a hæmorrhagic diathesis of nine years' duration which she acquired a few months after childbirth; as the result of their investigations they believed that the condition was due to inhibition of thromboplastin (of which there was no lack) by a specific antithromboplastic factor.

Heparin has been found to inhibit the agglutination and disintegration of platelets, preventing the liberation of thromboplastin. This is but one way in which heparin may interrupt the coagulation reactions.

#### *Excess of "Anti-thrombin" or "Anti-prothrombin".*

A substance, "anti-thrombin", can be detected in the circulating blood, which is said to neutralize any thrombin that may form. Quick has stated that this "anti-thrombin" lies in the albumin fraction of the plasma and normally can neutralize thrombin only after the fibrinogen has been coagulated. However, when potentiated by heparin, the "anti-thrombin" has such an increased affinity for thrombin that the latter becomes inactivated before it can act on fibrinogen. A similar substance, "anti-prothrombin", is formed when heparin reacts with another plasma constituent; as its name implies, "anti-prothrombin" prevents the conversion of prothrombin to thrombin.

Thus we have evidence that there are three ways in which heparin may act as an anticoagulant—by preventing the liberation of thromboplastin from platelets, and, with the plasma, by forming "anti-prothrombin" and "anti-thrombin". Furthermore, heparin is most probably the cause of the failure of the blood to coagulate in certain instances of anaphylactic shock and of the shock following the intravenous administration of peptone.

#### *Diminished Fibrinogen Content.*

Fibrinogen is formed in the liver. Severe destructive changes in this organ—for example, acute yellow atrophy, yellow fever, secondary carcinoma, chloroform or phosphorus poisoning—may be associated with a decreased fibrinogen content of the plasma. Henderson *et alii* have reported that in cases of congenital hypofibrinogenemia, in which the plasma fibrinogen level is only one-twentieth of the normal figure, the clotting time of the blood is normal; therefore fibrinogen must be virtually absent from the blood for clotting to be delayed. Corbett has recently reported a hæmorrhagic diathesis occurring in a newborn infant due to congenital afibrinogenemia; he could find but seven other cases recorded in the literature. Acquired fibrinogenopenia is an equally rare cause of failure of the blood to coagulate, and usually results from gross disease in the liver and bone marrow.

#### *Possible Absence of "Factor V".*

In addition to the generally accepted substances enumerated above, Owren has lately postulated that a pro-enzyme and an enzyme, which he called respectively "Factor V" and "Factor VI", are essential for coagulation. His patient was a female, aged more than twenty years, who had suffered from a hæmorrhagic tendency with a prolonged clotting time since the age of three and a half years. As the result of his investigations Owren concluded that her blood lacked a proenzyme "Factor V", which is converted to the enzyme "Factor VI", the latter being essential for the alteration of prothrombin to thrombin.



in the presence of ionized calcium and thromboplastin. Owren called the hemorrhagic state due to lack of "Factor V" "parahemophilia", and contrasted it with hemophilia, in which free or active thromboplastin is deficient. It remains to be seen whether subsequent workers will confirm the existence of these "factors".

#### Fibrinolysis.

An activity of human plasma known as fibrinolysis has attracted considerable attention of late; in this phenomenon clots formed by normal whole blood or by recalcified citrated or oxalated plasma break up and disappear soon after coagulation, and the addition of thrombin will not reinduce clotting. Normally clot should remain intact in serum for days, provided bacterial growth is prevented. Tagnon, Levenson, Davidson and Taylor report an obstetric case not unlike that described in this paper; their patient suffered from severe post-partum hemorrhage, was treated by blood transfusion and then hysterectomy, but died. Whole blood taken shortly before death failed to clot, and Tagnon and his associates were able to demonstrate in it a fibrinolysin. They centrifuged the blood which had failed to coagulate, took 0.1 millilitre of the plasma-like supernatant fluid and added it to 0.1 millilitre of fibrinogen solution. A coagulum formed, which, however redissolved in one hour.

Macfarlane, working in conjunction with Pilling and Biggs, has produced experimental evidence in support of a theory that normal plasma contains at least three factors concerned in fibrinolysis. He has called these factors "plasmin", "plasminogen" and "anti-plasmin".

"Plasmin" is his name for the proteolytic and fibrinolytic enzyme, and "plasminogen", which he states occurs in the globulin fraction of normal plasma, is the inactive precursor of "plasmin". "Anti-plasmin" is the anti-proteolytic factor from the albumin fraction which prevents fibrinolysis in normal blood. Macfarlane considered that fibrinolysis might result from either destruction of the "anti-plasmin" factor or activation of the "plasminogen" factor; he made the following statement:

The possible significance of such a process becomes more apparent when it is realized that the plasminogen of normal blood is of a potential activity sufficient to destroy the total fibrinogen of the body in a few minutes, and the more interesting since it is apparently associated with the problematic condition of "shock".

In further studies Macfarlane and his associates have shown that fibrinolysis occurred in the blood of each of a small number of subjects to whom adrenaline was administered, and of persons in a variety of physiological and pathological states in whom increased adrenaline secretion might be expected. They consider that "adrenaline may be a link in the chain of events leading to proteolytic activity in the blood of the living subject".

That fibrinolysis, or more correctly fibrinogenolysis, may be the cause of failure of the clotting mechanism provides intriguing speculation; but as yet there is no evidence that such is the case.

#### Summary.

A case of failure of coagulation occurring in a woman during abnormal labour is reported.

Possible causes of failure of coagulation are briefly discussed in the light of this case which occurred at the Royal Hospital for Women.

#### Acknowledgement.

I am indebted to Dr. K. J. Howell, assistant honorary obstetrician and gynaecologist to the Royal Hospital for Women, for permission to report this case.

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## Reports of Cases.

### THE USE OF PERITONEAL DIALYSIS IN A CASE OF ECLAMPSIA.

By JOAN A. MARSDEN,

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THE following is a brief summary of the clinical history of an eclamptic patient admitted to this hospital on July 29, 1947.

#### Clinical Record.

Mrs. B.B., aged twenty-six years, a *primipara*, due to be confined on August 24, 1947, had been well during her pregnancy until three weeks before her admission to hospital. During these three weeks she developed oedema of the face, arms and legs, together with severe headache and disturbance of vision, and these symptoms became progressively worse. On her admission to hospital she was semi-comatose and affected by severe generalized oedema. Her systolic blood pressure was 195 millimetres of mercury and her diastolic pressure 150 millimetres, her pulse rate was 116 per minute and her urine was "solid" with albumin. The uterus was enlarged to the size of a thirty-six weeks' gestation, but no foetal heart sounds were heard.

On the day of her admission to hospital she had five generalized convulsive seizures, and she passed during the first fifteen hours 12 ounces of heavily blood-stained urine which was "solid" with albumin. During this time heavy sedation was employed; 50% magnesium sulphate solution was given intramuscularly and 800 millilitres of a 20% solution of glucose in water were given intravenously.

The next day she was given 200 millilitres of 50% glucose solution intravenously and had secreted only a further two ounces of urine, and the oedema was increasing. She was given a further 800 millilitres of 20% glucose solution intravenously on this second day, and only one ounce of urine was passed; the urine was still heavily bloodstained and still "solid" with albumin.

Thus, thirty hours after her admission to hospital the patient had received 1600 millilitres of a 20% solution of glucose in water intravenously, and 200 millilitres of a 50% solution of glucose in water, and had passed 15 ounces of heavily blood-stained urine "solid" with albumin. The oedema had increased, and she had had five generalized seizures, was restless between seizures and was still comatose.

Towards the end of the second day a classical Caesarean section was performed under local anaesthesia and a dead foetus was removed. During the next few hours the patient's condition seemed improved; her pulse was of better volume and she was at times able to be roused. Her blood pressure was 140 millimetres of mercury (systolic) and 80 millimetres (diastolic). The haemoglobin value immediately after operation was 55%, so after the intravenous administration of a further litre of 20% glucose solution she was given by transfusion two pints of blood and then one litre of triply concentrated serum.

On the third day, the systolic blood pressure was 160 millimetres of mercury and the diastolic pressure was 80 millimetres; the deposit of the urine was three-eighths albumin, the blood urea content was 57 milligrammes per

centum and the serum protein content was 5 milligrammes per centum. In the previous twenty-four hours, nine and a half ounces of heavily blood-stained urine were passed. The patient's clinical condition was now grave. She was grossly oedematous and comatose and had stertorous breathing; she could not now be roused. She was secreting very little urine. The intravenous administration of one litre of isotonic sodium sulphate solution followed by one litre of serum was begun, and it was decided to institute peritoneal lavage. After this had been accomplished, three and a half ounces of urine were passed during the next twelve hours; the urine was becoming progressively less blood-stained. Although the patient's clinical condition seemed to be improved, and she was at times able to be roused, she died at 7 a.m. on the fourth day, approximately sixty-four hours after her admission to hospital.

#### Post-Mortem Examination.

At the post-mortem examination, the salient findings were as follows. The bladder and ureters were full of urine which was not blood stained. The kidneys were oedematous, but otherwise appeared normal on macroscopic examination. There was good demarcation between the cortex and the medulla. Microscopic examination of the tubules revealed albuminous material. In the glomeruli occasional evidences of eclampsia were found. The peritoneum contained approximately 30 ounces of straw-coloured fluid (the deficit of dialysate). Macroscopic examination of the liver showed it to be oedematous and fatty, and petechial hæmorrhages were scattered over its surface. Microscopic examination of the liver revealed patches of necrosis and a fair amount of hæmorrhage typical of eclampsia. In the lungs massive oedema was present. Generalized oedema was found in the brain; numerous minute petechiæ were scattered throughout the whole of the brain substance.

#### Technique of Peritoneal Dialysis.

Peritoneal dialysis was carried out as follows. Through a skin incision in each flank a large trochar and canula was introduced into the peritoneal cavity. The trochar was withdrawn and a large Malecot catheter, size 14, was inserted through the metal canula to give support to the catheter. One catheter was connected to a container of modified Tyrode's solution; this was accomplished by means of blood transfusion apparatus using high pressure tubing of one-quarter inch bore, the fluid passing through a water bath at 35° C. before entering the peritoneal cavity. This solution at first was run in at the rate of one ounce a minute, and the other catheter started to drain immediately into the receiving bucket. By measurement of the amount of fluid in this bucket at varying intervals, the rate of inflowing fluid was so adjusted that inflow approximated to outflow. It was found that approximately half an ounce per minute was the optimum rate of inflow in this case. During the next twelve hours, 320 ounces were dripped through the peritoneal cavity and 290 ounces were obtained from the outgoing catheter; this left a deficit of 30 ounces, which was found in the peritoneal cavity at the post-mortem examination.

#### Comments on Treatment of the Renal Failure.

Despite massive intravenous therapy in an endeavour to promote diuresis, the patient secreted very scanty blood-stained urine which contained massive amounts of albumin. The patient had renal failure, the blood urea level being 57 milligrammes per centum (a high figure in pregnancy), and so peritoneal dialysis was instituted in an attempt to create an artificial kidney. By this means it was hoped that the toxæmia might abate, and so the patient would be tidied over until her kidneys had regained their function.

Thus the peritoneum was used as a membrane through which would be dialysed the toxic products of the blood. The solution used for this purpose was a modified Tyrode's solution. This contained electrolytes in those proportions which would not alter the normal electrolyte pattern of the extracellular fluids of the body. In addition it was made hypertonic with the addition of glucose (5%),

to permit the maximum diffusion of waste products from the blood across the dialysing membrane. In addition the fluid contained penicillin and sulphathiazole as a prophylactic measure against infection of the peritoneal cavity, as well as heparin to prevent adhesion formation. Biochemical analysis of the fluid obtained from the receiving bucket showed that it contained 100 milligrammes of urea per 100 millilitres, or a total of nine grammes of urea. Thus this urea nitrogen concentration gave a relative index of those toxic products which were extracted from the blood and passed into the dialysate. Unfortunately the blood urea estimation was not repeated before the patient's death.

In this particular case the kidney damage was not irreversible, as is evidenced by the urine seen in the ureters and bladder at the post-mortem examination; the urine was not blood stained, and its secretion was probably due to the intravenous administration of sodium sulphate solution. Microscopic examination of the kidney showed only scattered lesions of eclampsia. These evidently were not generalized and irreversible.

Examination of the brain *post mortem* revealed gross oedema and multiple petechiæ, and it would seem that, if the peritoneal dialysis had been instituted earlier, and if less fluid had been given intravenously, the toxæmia and oedema might have been lessened, so that irreversible changes in the brain and its vessels might have been prevented.

There was here a deficit of 30 ounces in the outflow of dialysing fluid. The aim would be so to adjust the inflow of this fluid that more would be obtained from the outflow by means of the osmosis of the hypertonic fluid, and so the oedema would be reduced as well as the retention of toxic products.

#### Summary.

A case of eclampsia is reported in which peritoneal dialysis was instituted in an endeavour to create a temporary artificial kidney. One hundred milligrammes of urea *per centum* were obtained from the dialysate, this figure being used as an index of unknown toxic products removed from the blood.

#### Acknowledgements.

I am indebted to Dr. Ella Macknight for permission to publish this report, and to Miss Burgess and her staff of the hospital pharmacy for their cooperation in preparing the large quantities of fluid required.

### Reviews.

#### A YEAR BOOK OF NEUROLOGY, PSYCHIATRY AND NEUROSURGERY.

In the 1946 Year Book series a section on neurosurgery has been added to the volume on neurology and psychiatry, and endocrinology has been transferred to a new volume in the series with metabolism and nutrition. There certainly appears to have been ample neurological literature available to justify this more specialized grouping and to make "The 1946 Year Book of Neurology, Psychiatry and Neurosurgery" a book of comfortable size.<sup>1</sup>

The section on neurology, edited by Hans H. Reese and Mabel G. Masten, is subdivided, as before, into parts dealing with anatomy, physiology and pathology, convulsive disorders, disorders of the central nervous system and diagnostic procedures. Prominence is given to some important advances in knowledge of the functional anatomy of the nervous system; a surgical method of relieving Parkinsonian tremor is described. The modern treatment of epilepsy is discussed with particular attention to the newer drugs, such as

<sup>1</sup> "The 1946 Year Book of Neurology, Psychiatry and Neurosurgery"; Neurology—edited by Hans H. Reese, M.D., and Mabel G. Masten, M.D.; Psychiatry—edited by Nolan D. C. Lewis, M.D.; Neurosurgery—edited by Percival Bailey, M.D.; 1947. Chicago: The Year Book Publishers, Incorporated. 7" x 4½", pp. 732, with many illustrations. Price: \$3.75.

"Tridione" and "Mesantoin". A series of articles, including a report of case by Leonard B. Cox, of Melbourne, reveals the after effects of head injuries. The involvement of the central nervous system by a variety of conditions is considered in a series of papers reviewed, including a description of encephalitis following varicella by Charles Swan, of Adelaide; there are a number of interesting reports dealing with the value of penicillin, streptomycin and sulphonamides in meningeal infections. So the abstracts continue through affections of the peripheral nerves, disorders of the spine and spinal cord and of the muscular system, neurological aspects of vascular disorders and recent work on the functions of the autonomic nervous system. The present treatment of neurosyphilis is evaluated with special attention to penicillin and malaria therapy.

Nolan D. C. Lewis again has edited the section on psychiatry. He has subdivided the abstracts as before into groups dealing with general topics, child psychiatry and the main accepted classes of psychiatric disorder. The subsection on military psychiatry, introduced during the war years, is still retained. The inclusion of a new subsection dealing with special therapy, and more particularly with electric shock therapy and prefrontal leucotomy, is significant of present trends.

The new section on neurosurgery has been edited by Percival Bailey, professor of neurology and neurological surgery in the University of Illinois. He comments, in his introduction, that the advisability of introducing the new section may be disputed; "it is perhaps only a reflection of the growing importance of the specialty of neurosurgery which threatens to engulf and extinguish neurology to the detriment of both". The subdivisions of the section deal with peripheral nerves, intractable pain, sympathetic surgery, purulent infections (the surgical treatment of cerebral abscess and of acute purulent peripachymeningitis), herniated disks and myelopathy, spinal and cranio-cerebral injuries, vascular lesions, intracranial tumours and miscellaneous subjects. Much of the material considered is the result of wartime experience. It is interesting to note the editor's comment that few advances have been made in the treatment of peripheral nerve injuries. A good deal of attention is paid to the relief of causalgia. Reference is made to articles by H. C. Trumble, of Melbourne, on prolapsed intervertebral disks, by Murray A. Falconer, of New Zealand, on penetrating head injuries, by R. A. Money, of Sydney, on the repair of cranial defects by bone grafting, and by A. Schüller and F. Morgan, of Melbourne, on *cephalohæmatoma deformans*.

This volume is, as usual, well produced with useful indexes of subject matter and of authors. A useful small feature is the inclusion in the introduction to each of the sections on neurology and psychiatry of a list of important books and monographs published during 1946. The book will be of particular value to specialists in the subjects considered and should be of interest to a much wider circle.

#### RECENT WORK IN OBSTETRICS AND GYNÆCOLOGY.

"THE 1946 YEAR BOOK OF OBSTETRICS AND GYNÆCOLOGY", edited by J. P. Greenhill, has made its appearance.<sup>1</sup> It has been planned on the same lines as its many predecessors in this series, and will no doubt be as useful as they have been. In this volume the editor has commented freely on many of the abstracts which he has included. Sometimes he refers the reader to work done by authors other than those whose abstract he has published. Sometimes he commends certain work; sometimes he writes frankly: "I do not agree that . . ." The book has a friendly tone about it and this cannot fail to attract new adherents.

The first part on obstetrics is divided into four sections devoted in turn to pregnancy, labour, the puerperium and the newborn. Conspicuous in this part are several references to food and nutrition generally, and also to penicillin and the sulphonamides. In regard to the two last-mentioned medicaments we read in the editor's comments that the use of these substances makes invasion of the uterus in the presence of fever relatively safe. Again in another place he gives a sound warning—some women will die despite these drugs; it therefore behoves us to be as careful and as conscientious as we were before the introduction of

the sulphonamides, penicillin and streptomycin. In the section on the newborn there appears a phrase that will be new to many readers—it is "fetal blackout". This term has been coined by Isadore Slavin to describe the phenomenon of complete or partial asphyxia in the foetus. One striking contribution in this section deals with the obstetrician's responsibility for hazards of the first few days of an infant's life; special reference is made to anoxia and prematurity. The editor thinks so highly of this piece of work that he embellishes it with nearly two pages of comment.

The part of the book devoted to gynecology has a useful section on general principles. Here are several references to psychosomatic factors in gynecology. This gives the editor scope for some pertinent remarks on the value of the personal side of a medical attendant's ministrations, an aspect which is too often overlooked because of haste or because of over-concern with elaborate methods of diagnosis. The section on ectopic pregnancy, though short, is first rate. This condition is described as more often overlooked and more often diagnosed when it is not present than any other serious pelvic condition. The section on operative technique is well illustrated. The section on menstruation is full of useful information. Of special interest is the occurrence of amenorrhoea among women during internment as prisoners of war. The book concludes with a short section on endocrinology applied to gynecology.

#### AN ATLAS OF BACTERIOLOGY.

THE study of biological subjects must of necessity be accompanied by living material in illustration, and also by the practical use of techniques employed in its examination. It is the constant concern of teachers in the medical branches of biology that students seldom have time to practise these techniques sufficiently to rely on the results of their own efforts in the laboratory. Bench demonstrations are a great help during the progress of classes, but for revision and later study, the average diagrammatic representation falls far short of reality, and it is here that the "atlas" comes into its greatest sphere of usefulness. The present volume by R. Cranston Low and T. C. Dadds,<sup>1</sup> entirely in colour, is admirably suited for this purpose, covering as it does the wide range of pathogenic agents usually presented to the student of infectious disease—bacteria, viruses, protozoa and fungi. The authors include the microscopic appearances of organisms on normal mucous membranes, in pathological exudates and in pure cultures, and the macroscopic appearance of cultures on media in common use, single colonies and massed growth. There are good illustrations of virus inclusion bodies, and a single plate of electron microscope pictures. Each is accompanied by a statement of the magnification and the stain used, and a very brief description of the plate. (The authors are careful to state that the atlas is intended to be used in conjunction with any recognized textbook of bacteriology.) The general standard of the colour printing is high, with a few exceptions which therefore appear more conspicuous. The representation of the blood agar plate culture of *Staphylococcus aureus* entirely fails to convey the shining moist "wet-paint" appearance; the large plate of single colonies of *Corynebacterium diphtheriae* is too brown, and carries the serious mistake in the legend that the *mitis* colony has a matt surface—on the majority of blood tellurite media, the *mitis* colony has a smooth moist surface, and a gunmetal grey colour.

There is a plate showing pneumococcal capsules retaining the counterstain in Gram's method. This is indeed a rare occurrence (as stated in the legend), and therefore it is a mistake to include it amongst routine appearances for students to study.

The illustration of the fine coagulum in the cerebrospinal fluid of a patient with tuberculous meningitis is particularly good, and the collection of pictures of fungal infections of skin and hair are really lifelike, although we should have liked to see the characteristic chlamydospore of *Monilia albicans* included in the cultures of that organism.

Students, especially the examination conscious, will find this atlas a valuable help, and the authors are to be congratulated on producing a book which must be a companion and not a substitute for the prescribed textbook of the subject.

<sup>1</sup>"The 1946 Year Book of Obstetrics and Gynecology", edited by J. P. Greenhill, B.S., M.D., F.A.C.S., 1947. Chicago: The Year Book Publishers, Incorporated. 7" x 4½", pp. 656, with many illustrations. Price: \$3.75.

<sup>1</sup>"Atlas of Bacteriology", by R. Cranston Low, M.D., F.R.C.P.E., F.R.S.E., and T. C. Dadds, F.I.M.L.T., F.I.B.P., F.R.P.S., 1947. Edinburgh: E. and S. Livingstone, Limited. 9½" x 6", pp. 178, with many coloured illustrations. Price: 32s. 6d.



# The Medical Journal of Australia

SATURDAY, NOVEMBER 15, 1947.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

## MEDICAL EDUCATION IN THE UNITED STATES AND CANADA.

In the issue of July 19, 1947, reference was made in these columns to medical education in Great Britain and to recommendations made by the General Medical Council of Great Britain in the light of views expressed by the "Goodenough Report". It was shown that revision of the medical curriculum was necessary and that this arose from various factors. In order to extend the view of Australian practitioners on this all-important subject of medical education, attention is now directed to a survey of medical education in the United States and Canada carried out by the Council on Medical Education and Hospitals of the American Medical Association.<sup>1</sup> This report is the forty-seventh annual compilation of information and statistics made by the Council on this subject. It is a fuller document than has been possible since 1942. Being an annual report, it sets out information on the general set-up of teaching and examining bodies in medicine and may in no way be regarded as a critical document. The last comprehensive survey on medical education in the United States was conducted by the Council on Medical Education and Hospitals during the period 1934-1936; these findings together with certain supplementary studies were published in 1940 in what became known as the Weiskotten Report. We are told that it led to the prompt correction of many of the deficiencies that were brought to light. Something like the Weiskotten Report may be expected to appear in America before long, because the Board of Trustees of the American Medical Association has authorized the Council on Medical Education and Hospitals to conduct another comprehensive survey of medical education. In the making of this survey the Association of American Medical Colleges will join. Plans are at present being drawn up by these two bodies for a start to be made on this new survey.

The present document shows that there are in the United States 70 medical schools which have been approved by the Council on Medical Education and Hospitals; Canada has nine such schools; and there are in the United States and Canada eight approved schools of the basic medical sciences. Two of the last mentioned are "on probation". If we take the population of the United States to be 125 million and that of Canada to be 10 million, the former has one medical school for each 1.78 million of population and Canada one medical school for each 1.25 million. Australia with a population of seven million has one medical school for each 1.75 million of population. The total number of enrolments by classes in the medical and basic science schools in the United States and Canada for 1946-1947 was 26,882 (students in the intern year are not included in this total). This is made up of 23,900 for the United States and 2,982 in Canada. The increase of numbers is shown by a table dealing with United States figures for medical and basic science schools. The totals for 1930-1931 and for 1938-1939 were 21,982 and 21,302 respectively. Of the 23,900 students enrolled during 1946-1947 a total of 13,308 or 55.6% were ex-service personnel, or "veterans" as they are called in the United States; 46 of the veterans were women. As would be expected, the highest percentage of veterans was in the freshman class where the figure was 62.8% of the students enrolled. It is interesting to note that 23 schools reported that the veterans in the 1946-1947 freshman class did better work than the non-veterans; 51 schools reported that there was no significant difference between the work of the veterans and that of the non-veterans; one school reported that non-veterans did the better work; two schools were unable to express an opinion. About the same distribution of opinion was obtained in regard to the type of work done by freshman veterans as compared with freshmen of pre-war years. There has been an increase in the number of women studying medicine; during the past three years the number has almost doubled. In the year 1946-1947 women accounted for 9.1% of the total enrolment in the United States medical schools. The highest percentage, 11.1, was in the freshman class. It is thought that in the year 1947-1948 the percentage will decline to something like 9.0, but this will be well above the pre-war level. Another feature to which special attention should be drawn is the fact that some of the medical schools are continuing to use an accelerated course of study for all classes. Early in 1946 most of the medical schools decided to discontinue the accelerated course of study adopted during the war and have practically reverted to pre-war schedules. Seven of the four-year schools (this time description excludes the period devoted to the pre-medical basic sciences) are continuing the accelerated course for all classes. In four acceleration is compulsory; it is voluntary in the other three. No reason for this continuance of acceleration is given. It is pointed out in an editorial that many educators have felt that the numerous other difficulties surrounding medical education during the war made it impossible to assess accurately the merits of the accelerated schedule. The suggestion is made that the experience under peace-time conditions of the seven schools continuing the acceleration should make possible an appraisal of the "educational experiment" of accelera-

<sup>1</sup> The Journal of the American Medical Association, August 16, 1947.

tion. This is an interesting happening; in contradistinction to it is the fact that in eighteen schools the senior year is being lengthened; in some the lengthening is planned as a permanent feature. It is suggested in the report that this may prove to be a satisfactory method of providing in the curriculum for important subjects for which adequate time cannot be allotted in the conventional senior year.

This subject cannot be left without some reference to finance. The budgets of the medical and basic science schools in the United States for the academic year 1947-1948 total more than 43 million dollars. This estimate excludes almost entirely expenditure on the care of patients in teaching hospitals. Although there was a certain lack of uniformity regarding the sources from which this figure was compiled, the total is thought to be valid. Of the total of 43 million dollars, students' fees will provide no more than 12 million dollars and probably less; the remaining 31 million dollars will be obtained from income from endowments, general university funds, appropriations from tax funds, gifts and other sources. A table is given dividing into eight groups the seventy-seven medical and basic science schools of the United States according to the anticipated expenditure per student for 1947-1948. The first group of 12 schools will spend 600 to 999 dollars per student; 22 will spend 1000 to 1499 dollars, 15 will spend 1500 to 1999 dollars, 14 will spend 2000 to 2499 dollars; the remaining groups comprise 5, 5, 1 and 3 schools. The three schools in the last mentioned group will spend over 5000 dollars per student. In the largest group the expenditure is thus from 1000 to 1499 dollars a year per student. It would be interesting to know how the differences in expenditure could be explained. The important point is that, as explained in a special editorial, one-fourth of the medical schools are operating on "grossly inadequate" budgets and that the efforts of many more schools are limited by budgets that are only slightly less inadequate. *The Journal of the American Medical Association* pleads for more direct support for the educational activities of medical schools, important though research in its direct and indirect results undoubtedly is. This is an aspect that should be considered in Australia as well as in America. Special endowments are sometimes given to scientific bodies, earmarked for expressly named purposes, and the controlling authorities of these bodies may be in serious difficulties to provide the money to carry on essential activities. This has happened in Australia.

In this short statement some of the more important aspects of the report of the Council on Medical Education and Hospitals have been mentioned. On a future occasion it may be possible to bring to the notice of Australian practitioners the workings of the approved examining boards in medical specialties that function in the United States. For the present we can note the fact that the United States and Canada share many of their problems in medical education with other parts of the English-speaking world. The more widely these problems are recognized and understood, the more likelihood will there be of their solution. It would probably be useful if some organization or group of authorities were to arrange for a survey of medical education to be carried out in Australia. But that is a matter for a future discussion.

## Current Comment.

### SYPHILIS AND LIFE INSURANCE.

At the request of the Veterans (that is, ex-service personnel) Administration in the United States a memorandum was prepared by Joseph Earle Moore and Ira Leo Schamberg concerning the eligibility of syphilitic persons for life assurance. This was submitted to and approved by the subcommittee on venereal diseases of the National Research Council early this year and has now been published.<sup>1</sup> Although the data considered are drawn from the United States and certain aspects of the discussion concern only those whose business is life insurance, the memorandum contains much of general interest. It is pointed out that certain quite formidable difficulties arise in the approach to this subject. The first has to do with the comparison between the "non-syphilitic" group in the population and the group of known syphilitics in relation to the mortality rate. The supposedly non-syphilitic population contains an unknown number of persons with "actuarially unrecognized syphilis"; the published mortality data concerning syphilitics do not take into account the wide variation in life expectancy related to stage and type of infection and the age of the subjects; mortality data from death certificates are fallacious, as a diagnosis of syphilis is often omitted either inadvertently or deliberately for fairly obvious reasons; syphilis mortality figures are weighted by "the fact that syphilis is primarily a disease of those of lower socioeconomic groups, which are subject to increased mortality risk from many other diseases and conditions"; the adequacy of present-day treatment methods is not taken into account. The second difficulty is that studies of the mortality of syphilis as related to the adequacy of treatment are, as a rule, a generation out of date; with the changes that have occurred in the whole concept of treatment such studies become valueless.

Moore and Schamberg then go on to summarize certain important facts about syphilis. They point out that acquired syphilis is a chronic disease, which seldom if ever kills within the first few years after its acquisition. The death rate from untreated acquired syphilis does not become significant until twenty or more years after acquisition. At least 95% of all deaths from acquired syphilis are due to one or a combination of three causes: cardio-vascular syphilis, neurosyphilis or the hazards of treatment; deaths from the first two occur late, those from the third occur at any time. Particular clinical lesions which involve a high mortality rate are usually readily recognizable clinically after their development. The probability of the eventual clinical development of neurosyphilis and still further manifestations of its type can be predicted with a fair degree of accuracy at any time after the second year of infection by means of routine examination of the spinal fluid; the occurrence of cardio-vascular syphilis is not so predictable. Any form of acquired neurosyphilis carries a higher mortality risk than forms of syphilis not affecting the nervous system. The mortality of syphilis is affected by race (higher in Negroes than whites) and especially by sex (higher in males than females). Untreated acquired syphilis is not necessarily a fatal or even a serious disease; at least 50% of infected persons show no apparent effect on individual health and only about 25% develop potentially fatal late forms of the disease. A positive result to a blood serological test for syphilis during life, whether in persons treated or untreated for syphilis, is not a necessary indication of anatomical damage; in at least 60% of such persons no gross or microscopic evidence of damage from syphilis can be found *post mortem*. The mortality from congenital syphilis (excluding neurosyphilis) is practically confined to the first two years of life. The existence of acquired syphilitic infection does not predispose to death from other causes, such as cancer and tuberculosis. The overall

<sup>1</sup> *The Journal of the American Medical Association*, August 30, 1947.

mortality rate from syphilis, at any stage of the congenital or acquired infection, may be profoundly modified by anti-syphilitic treatment. The laboratory diagnosis of syphilis is not altogether accurate, since "false positive" results to serological tests may occur in normal persons (perhaps 1 in 4000 of those tested) or may be produced by a number of non-syphilitic conditions (vaccinia, malaria, acute infections of the upper respiratory tract and infectious hepatitis).

This long series of semi-dogmatic statements (some common knowledge, some controversial) put forward by Moore and Schamberg has been given in detail mainly because it is such a "meaty" summary of aetiological, diagnostic and prognostic features of the disease and also because it is the basis of the further discussion in the memorandum. Three alternative policies are suggested as to syphilis in applicants for life insurance: complete disregard of the factor of syphilis, routine blood serological test for all applicants in addition to the normal questioning and examination, and disregard of syphilis unless it is revealed by the customary type of examination. It is considered that the first possibility would appreciably increase the actuarial risk; the second would raise difficult problems in the interpretation of serological tests; the third, despite its drawbacks, will probably continue in force.

With regard to applicants in whom syphilis is detected, the memorandum states certain principles which to the authors appear clear. No applicant with untreated syphilis in any stage should be accepted if the policy requires good health. If treatment has been given, it should have been adequate by modern standards. If necessary a period of observation should be required in order to demonstrate the probability of cure. The findings on examination of the cerebro-spinal fluid should have been shown to be within normal limits, the tests having been made two years or more after infection. No clinical evidence of cardio-vascular syphilis, neurosyphilis or other forms should be present (apart from scars of healed gummatous lesions or stigmata of congenital syphilis). The authors have compiled a table which sets out in some detail their suggestions for the assessment of the insurability of patients with various types of syphilis. There is much interesting material and discussion in this memorandum, and its careful reading would well repay those who have to deal with such matters, even though they may not agree with all the opinions expressed.

#### "DICUMAROL" IN THE TREATMENT OF CORONARY OCCLUSION.

ANTICOAGULANT PREPARATIONS have received a good deal of prominence of late and their use has extended to a good many fields. The principal applications of one of the most important of these preparations, "Dicumarol", was discussed in these columns on March 22, 1947. A number of clinicians in the United States have been conducting cautious trials of its use in the management of coronary occlusion—a logical enough idea, but one not lacking in possible pitfalls. Very brief reference was made to this work in a paper by Kempson Maddox published in this journal on July 5, 1947, and more details are now available in a paper on the treatment of coronary artery disease by O. P. J. Falk, assistant professor of clinical medicine in the Saint Louis University School of Medicine.<sup>1</sup> Falk makes it clear that, although the value of the treatment was not yet fully assessed at the time when the paper was written, preliminary results had been encouraging, and the American Heart Association was setting up a committee, under the chairmanship of Irving S. Wright, composed of the heads of large medical services who were to be asked to use "Dicumarol" in alternate cases in an attempt to evaluate its influence on mortality. Wright has already carried out important work along these lines, and Falk states that Wright's results

in the treatment of eighty patients appear to show a reduction in anticipated mortality of at least a third by comparison with previous series in which conventional therapy was used. Post-mortem examination of subjects who died revealed no evidence that "Dicumarol" had caused any harmful effects. In no case was there any evidence that the old thrombus might have resolved or that the progression of an established infarction had been intercepted. Falk states that it is realized that such a process cannot be anticipated, but that it is thought that "the drug may combat the tendency for propagation of a thrombus and may reduce the tendency towards phlebotrombosis and intramural thrombi as well as the incidence of consequent pulmonary infarction and systemic embolism". Encouraging reports by other workers are also quoted.

Falk goes on to describe the detailed routine for "Dicumarol" therapy. Contraindications to its use in coronary occlusion include hæmorrhagic blood dyscrasias, advanced hepatic disease, a history of ulcer or recent hæmorrhages of the gastro-intestinal tract, and renal insufficiency which might prevent proper excretion of the drug. Subjects of the therapy must be in hospital, and it is essential to be certain that the laboratory is prepared to make accurate estimations of prothrombin levels, which must be determined each morning before the day's dosage of the drug is given. Papaverine is administered intravenously; oxygen and morphine also are given if necessary. "Dicumarol" is then given by mouth each day, according to a scheme of dosage dependent on the daily determined prothrombin level, for four to six weeks. Hæmorrhagic phenomena accompanying an unduly low prothrombin level are treated with vitamin K given intravenously, and for alarming hæmorrhage a transfusion of freshly citrated blood is recommended.

Other features of treatment set out by Falk should perhaps be mentioned. For the relief of pain due to the occlusion he administers papaverine intravenously, followed, if necessary, by a hypodermic or intravenous injection of morphine; papaverine is also considered to assist in preventing ventricular fibrillation. Absolute physical and mental rest is imperative. Oxygen is always indicated. Falk administers quinidine sulphate, three grains three times a day, as prophylaxis against ventricular fibrillation to patients with severe myocardial infarctions, particularly if there is a tendency to extrasystoles. He also advocates, during the period of convalescence, knee flexing exercises and deep breathing to prevent thrombus formation in the veins of the pelvis and lower extremities; the latter is otherwise a possible complication of the enforced rest and brings a very real hazard of pulmonary embolism. Dietary rules are particularly aimed at the avoidance of gastric distension. Suitable measures are taken to obviate straining at stool. Bed rest is necessary for a period ranging from one to six weeks or even longer, according to the individual case. Understanding guidance and assistance in adaptation to a new level of living are an essential part of the treatment to be given during convalescence.

Contributing to the discussion which followed the paper, E. Sterling Nichol presented his own results in the treatment with "Dicumarol" of 68 attacks of coronary occlusion occurring in 62 patients over a period of three years. No proven embolic phenomena occurred in the entire series, though there were eleven deaths. In eight autopsies performed there were no signs of mural thrombi, though autopsy statistics show that 50% of all myocardial infarcts produce mural thrombi. There were 38 first attacks with only one death. Nichol expressed strong disapproval of "masterful inactivity" as a basis of treatment. He described, as the principal reason for the use of an anticoagulant in coronary thrombosis, the prevention of embolic phenomena and of extension of the initial thrombus or of the occurrence of a second thrombus during convalescence. The results so far presented appear to verify the effectiveness of the drug in relation to these objects with a consequent reduction in mortality and invalidity, but the report of the American Heart Association's Committee will be awaited with much interest.

<sup>1</sup>The Journal of the American Medical Association, June 7, 1947.



## Abstracts from Medical Literature.

### THERAPEUTICS.

#### Propylthiouracil.

W. S. REVENO (*The Journal of the American Medical Association*, April 19, 1947) discusses 52 patients with thyrotoxicosis treated with propylthiouracil. An amount of 50 to 75 milligrammes per day was an adequate initial dosage; 25 to 50 milligrammes daily were sufficient for maintenance. The antithyroid effect was less than that obtained with thiouracil, but myxoedema and thyroid enlargement were rare in association with treatment by propylthiouracil. Forty patients had toxic nodular goitre, and fourteen toxic diffuse goitre. Of patients previously untreated, ten responded with improvement on doses of 50 to 150 milligrammes per day. Three patients did not respond by a drop in basal metabolism. These patients were between sixty and seventy years of age. Twenty-two patients were switched over from thiouracil to propylthiouracil. For doses of 100 to 400 milligrammes daily of thiouracil, 25 to 50 milligrammes of propylthiouracil were substituted. An average dose of 32 milligrammes daily was satisfactory. Five patients who had drug fever or urticaria when taking thiouracil were not ill when treated with propylthiouracil for four months. One patient developed nausea, chills and fever with sore throat and temperature up to 103° F. when taking 25 to 100 milligrammes of propylthiouracil daily. This recurred when the administration of the drug was resumed after suspension for some days. No other toxic symptoms were noted.

#### Cirrhosis of the Liver.

D. H. LABBY, R. E. SHANK, H. G. KUNKEL AND C. L. HOAGLAND (*The Journal of the American Medical Association*, April 19, 1947) describe the intravenous therapy of cirrhosis of the liver. The liver is susceptible to nutritional deficiencies. The glycogen content falls rapidly during brief starvation, and fat can be readily accumulated in liver cells by the administration of a diet rich in fat or of various hepatotoxins. A cirrhosis-like syndrome has been induced in animals by diets with low protein and high fat content. Choline and methionine are said to remove the process of accumulation of hepatic fat. It is said that cirrhosis is common among Moslems who do not use alcohol, but who suffer from various diet deficiencies. A balanced nutritious diet with vitamin B complex is said to be beneficial in cirrhosis of the liver; and recently choline has been lauded in treatment. In this study thirty patients with cirrhosis were treated with a crude watery liver extract by intravenous injection. This water soluble liver extract was specially prepared. This form of therapy is little understood, hence a crude extract containing most of the elements of normal liver was used. Intramuscular injection of the crude extract in large doses (five to ten millilitres) was very painful at times; for this reason the intravenous route was used. Up to twenty millilitres of crude liver extract, diluted with

thirty millilitres of isotonic saline solution, were injected into the veins two or three times weekly. Allergic reactions occurred rarely. As a test for sensitivity 0.1 to 0.2 millilitre of the undiluted extract is given intramuscularly. If within thirty minutes no reaction has occurred slow injection intravenously is made of 0.5 millilitre of the extract diluted with twenty millilitres of normal saline solution, distilled water or 5% dextrose solution. If headache or flushing occurs the extract should be injected more slowly, and later graduated doses should be given to initiate treatment. Diagnosis in the case of fourteen patients studied was made by laparotomy or needle biopsy; in the case of the remaining sixteen patients it was made by clinical methods. In half the patients signs of hepatic compensation had developed before treatment commenced; oedema, ascites, icterus and oesophageal hæmorrhage were noted singly or together. No special diet was given, except that alcohol was forbidden, and vitamin B was prescribed for patients suffering from clinical B avitaminosis. Twenty-one patients were alcoholics, and five patients had suffered from icterus in youth. Gain in appetite and weight were noted in all cases. Ascites disappeared in twelve cases. Improvement was observed in serum protein and bilirubin levels as well as in sulphobromophthalein retention. No other treatment was given to the majority of patients. Twenty-three of these patients lived for more than two years. The authors consider that the treatment gave good results in conjunction with a full diet.

#### Tetra-Ethyl-Ammonium Chloride.

J. C. LUKE (*The Canadian Medical Association Journal*, April, 1947) discusses a new drug, tetra-ethyl-ammonium chloride, which has the effect of causing temporary paralysis of the autonomic nervous system. The block occurs at the ganglion synapses and affects both the parasympathetic and sympathetic components. Its administration results in generalized vasodilatation and increase in skin temperatures, usually with lowering of blood pressure, especially in subjects with hypertension. The drug is used mainly in vascular disorders of the limbs, such as Buerger's and Raynaud's diseases, arteriosclerosis, chilblains and the like. A 10% solution is given by intramuscular injection with an effect lasting up to six hours, and when given intravenously, up to one hour. Dosage is 200 to 500 milligrammes given intravenously and ten milligrammes per kilogram of body weight given intramuscularly. Any severe fall in blood pressure can be countered by adrenaline. The effect of the drug is said to be as good as that of sympathetic procaine block, of local nerve block or of general or spinal anaesthesia.

#### Pruritus Ani.

L. G. BODKIN (*The American Journal of Digestive Diseases*, March, 1947) discusses pruritus ani and its treatment. He has followed up forty-two cases reported previously, in which good results followed the use of "Dilantin" and "Taka diastase", novotropine one-twenty-fourth of a grain, phenobarbital and "Sodium Dilantin", plus the application of 25% silver nitrate solution to the fissures. Mild soaps were advocated for washing clothes; no soap or water was used

on the skin; alcohol, mineral oil, fried food and condiments were avoided. Olive oil alone was applied locally. "Taka diastase" five grains and "Sodium Dilantin" one and a half grains four times a day were highly valued; the latter was reduced in dosage if toxic effects were noted. Glutamic acid thirty grains after each meal was also administered, with and without "Dilantin". The author has great faith in "Taka diastase" (to digest carbohydrates), "Sodium Dilantin" and glutamic acid.

### NEUROLOGY AND PSYCHIATRY.

#### Variable Tolerance for Alcohol.

A. M. MEERLOO (*The Journal of Nervous and Mental Disease*, June, 1947) draws attention to the influence of common drugs on tolerance to alcohol. Atropine given for Parkinsonism increases susceptibility. Barbiturate addicts may react to acute alcoholism in coma. The author reminds us of the increased susceptibility in close rooms without sufficiency of oxygen. High altitudes also lessen the threshold. He states that administration of oxygen in cases of acute intoxication by alcohol, particularly among children, is life-saving. Tolerance varies owing to a large variety of factors which include psychological circumstances, such as battle fatigue and anxiety neurosis. He states that it is still a matter of theory whether there is a real alcoholic allergy similar to the protein allergies.

#### Diagnostic Evaluation of Early Schizophrenia.

PHILLIP POLATIN AND PAUL HOCH (*The Journal of Nervous and Mental Disease*, March, 1947), in discussing the diagnostic evaluation of early schizophrenia, draw attention to the need for further work on the pre-clinical aspects of schizophrenia. Often the patients are diagnosed as suffering from psychoneurosis and the true picture becomes apparent after the waste of much effort on misdirected treatment. The authors regard shyness, reclusiveness, timidity, marked mood fluctuations and especially anxiety as suspicious early manifestations. More definite symptoms are lack of concentration, feelings of being doped, inability to reach people emotionally, constant feelings of fear, discontent and unreality. Diffuse psychoneurotic manifestations (pan-neurosis), with tensions, sleeplessness, anorexia, phobias and fears, are very suspicious. Schizophrenics are illogical in their attempt to explain symptoms. Emotion often lacks inhibitions and attacks of rage and hate occur. There is a frank, uninhibited expression of sexual thoughts. Predominating and active projection mechanisms with ideas of reference and persecution occurring in a manic or depressive affective setting are very suggestive of schizophrenia.

#### Lactic Acid and Depressive States.

HANS LOWENBACH AND MAURICE H. GREENHILL (*The Journal of Nervous and Mental Disease*, April, 1947) discuss the effect of oral administration of lactic acid upon the clinical course of depressive states. Working on the possibility that an unknown toxic product might be "burned in the fire of the convulsion", they have treated

patients with lactic acid, since this is eliminated in muscular contraction. Patients and seventeen controls (normal subjects) were used. Twenty-five millilitres of lactic acid (United States Pharmacopoeia) and 25 millilitres of sodium lactate (60% solution) dissolved in 300 millilitres of milk were given as a dose before retiring and early in the morning (two hours before breakfast). The authors claim an improvement in sleep and some amelioration of the depression.

#### Experimental Neurasthenia.

TRYVE BRAATOV (*The Journal of Nervous and Mental Disease*, May, 1947) discusses "experimental neurasthenia" produced in animals by H. S. Liddel and T. L. Bayne. He postulates that individuals without any particular hereditary nervous taint and without previous pronounced nervous reactions, but who, on the contrary, show excellent abilities and keen and spontaneous zest for work, may through intellectual overstrain acquire neurasthenic affections. These may arise rather suddenly, sometimes in quite acute forms, and may persist throughout many years. This conclusion is based on case histories. The author pleads for the realization that in many cases persistent headaches, tiredness, reduced powers of concentration and particularly difficulty in resuming work previously pursued are due to overstrain and the subjects should not be labelled lazy, asthenic or incompetent.

#### Institutional Treatment of Juvenile Delinquency.

LEONARD M. DUB (*The American Journal of Psychiatry*, May, 1947) states that the treatment in institutions of juvenile delinquents is significantly unsuccessful, even when the programme includes vocational guidance and graduated rehabilitation of individuals capable of meeting and solving the problems they will meet on return to society. One major reason for failure is that the antisocial behaviour is an outward manifestation of an inner conflict of which the subject is unaware. Therapy directed towards manipulation of conscious motivated factors is unlikely to influence unconscious factors. After physical needs come emotional satisfaction and security. The interpersonal relation with the mother usually sets this pattern. Dependency is characterized by abnormal needs for approbation of others and leads to frustration and eventual hostility. Attention should be directed towards increasing conscious awareness of what goes on inside, and to developing, in an indefinite number of personal interviews, a knowledge of those factors which drive the individual to the constant repetition of unsatisfactory behaviour patterns.

#### Addictions: Some Theoretical Considerations.

J. D. REICHAARD (*The American Journal of Psychiatry*, May, 1947) states that physical dependence upon a drug can be determined only by the abstinence syndrome, and this is stereotyped and physiological for a particular drug. Addiction is difficult to define, but involves consideration of such facts as self-control, self-injury or injury to the group and the condemnation of society. The ability to withstand discomfort, either physical or emotional, appears an important factor in deter-

mining the potential addict. This varies with the ethnic group, the setting in which the discomfort is encountered, the basic personality and the type of control called conscience or super-ego. The complications are chiefly secondary, for example, avitaminosis and a distortion of the personality as a result of attempts to obtain the drug. Most serious, however, is the loss of drive and industry. An organism that is entirely comfortable does nothing. The treatment requires control of the addict for a period of at least one year, relief of physical dependence when this is a complication of the drug used, removal of sources of discomfort and increase in the ability of the addict to endure discomfort. Improvement when possible of the internal controls of behaviour, supplemented for a long period with some type of supervision and correction of antisocial attitudes, is desirable but difficult to achieve.

#### Electric Shock Treatment during Pregnancy.

CAROL C. TURNER and LEONARD D. WRIGHT (*The American Journal of Psychiatry*, May, 1947) report a case of a twenty-two-year-old woman, four months pregnant, who developed a psychosis varying from a mute, catatonic state to a confused, hyperactive, hallucinated and deluded condition. She was given seventeen electric shock treatments, made a satisfactory recovery, and eventually was delivered of a normal child; both remained well after six months. The literature is reviewed covering nine cases in five articles. In four cases when electric shock treatment was used alone, no injury was done to the child. In two cases when insulin was used alone, the result was a macerated fetus in each case. In three cases electric shock treatment and insulin were combined; fetal death resulted in two cases, and in one a living child was obtained.

#### Electro-Shock and Tuberculosis.

OTTO ALLEN WILL, JUNIOR, and ADDISON M. DUVAL (*The Journal of Nervous and Mental Disease*, June, 1947) report a case in which tuberculosis became markedly active after completion of eight electro-shock treatments. They conclude, after survey of the literature, that the procedure may be accompanied by some risk, but they cannot say that it is a definite contraindication.

#### Treatment of Epilepsy with "Tridione".

LEON J. ROBINSON (*The Journal of Nervous and Mental Disease*, June, 1947) treated 100 patients with "Tridione" using a daily dose of 30 grains for adults and robust children and 15 grains for infants, given in three divided doses. The drug was added to the patient's usual anti-convulsant. Some improvement occurred in 92% of the patients. The author states that the success of "Tridione" is counterbalanced by the toxic phenomena, particularly among those beyond the age of adolescence.

#### Psychological Factors in Peptic Ulcers.

FREDERIC T. KAPP, MILTON ROSENBAUM and JOHN ROMANO (*The American Journal of Psychiatry*, March, 1947) studied twenty men at psychosomatic conferences at the Cincinnati General

Hospital. Wide variations in external personality characteristics were found, but all had conflicts over intense dependent desires and utilized various mechanisms to deal with these conflicts. Three groups of personality were defined. In the first group were six patients, the usually accepted type of ulcer personality, that is to say, the outwardly independent, hard-driving and successful type. These were revealed to be over-compensating for a deeply repressed, intense receptive desire. The second group (five patients) were fairly successful, but outwardly meek, shy and often quite effeminate. Here the dependent longing seemed to be at least partially conscious. Some satisfaction was obtained by overt dependence on a mother or mother substitute. The third group (nine patients) were those with severe character disorders. These had traits of the psychopathic personality, such as repetitive stereotyped self-destructive behaviour in the form of drinking, gambling, delinquency and inability to make a living. They expressed their demands by "acting out" their craving and were openly parasitic on their parents, wives and society.

#### Personality Changes after Leucotomy.

F. REITMAN (*The Journal of Nervous and Mental Disease*, June, 1947), discussing personality change after fifty leucotomy operations, finds that the main significance lies in accessibility. There is a marked transference to the doctor in charge of post-operative treatment. Altered attitude to money is often noticed, patients becoming bitter, mean and greedy or magnanimous spendthrifts. Moral values are changed, patients tend to accept but not do favours. Some patients showed transient spells of creative activity. Behaviour changes include aggression and extroversion. The author ascribes these to regression and reintegration. In his opinion leucotomy as a mode of treatment remains empirical and experimental.

#### Does the Psychopath Exist?

JEROME KAVKA (*The Journal of Nervous and Mental Disease*, July, 1947) gives a well-documented case history of an American marine thrice diagnosed as a psychopath. He points out that, although there are a number of factors suggesting psychopathy, the patient was a hypomanic whose grandiosity, impulsiveness and flight of ideas accounted for the abundance of antisocial behaviour. The emotional maladjustment and behaviour difficulties are outlined against a backdrop of serious family disharmony. The author agrees with Karpman that there are two distinct clinical types of psychopath, the symptomatic and the ideopathic who represents the apparently unmotivated expression of an, as yet, undefined personality structure.

#### Regeneration of Motor Fibres in the Ulnar and Sciatic Nerves.

SYDNEY SUNDERLAND (*Archives of Neurology and Psychiatry*, July, 1947) concludes that, for the terminal section of the ulnar nerve in the hand, the rate of growth was 0.6 millimetre per day after axonotmesis and 0.4 millimetre per day after suture, and for the section of the sciatic nerve just below the knee, the rate of growth after axonotmesis diminished from 2.0 to 1.0 millimetres per day.

## British Medical Association News.

### SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on June 26, 1947, at the Robert H. Todd Assembly Hall, British Medical Association House, 135, Macquarie Street, Sydney, Dr. H. R. R. GRIEVE, the President, in the chair.

#### Analgesia and Anaesthesia in Labour and Caesarean Section.

Dr. C. N. PATON read a paper entitled "Anaesthesia in Labour and Caesarean Section" (see page 589).

Dr. ROBERT MACKEY read a paper entitled "Local Anaesthesia in Obstetrics" (see page 593).

Dr. H. A. RIDLER said that he wished to thank both the speakers for their papers. He thought that most of what Dr. Paton had said was correct and he agreed with it, but he did not like some of it. Dr. Mackey's paper he thought was very good, but very limited. Dr. Ridler mentioned that he had endeavoured for years to have a meeting on such a subject. In regard to the type of anaesthetic given in eclampsia and toxæmia, Dr. Ridler referred to the five years' report on maternal mortality which had been published by the special committee set up by the Department of Public Health and published two or three years before. In all those cases of eclampsia and toxæmia only one patient had been given gas and oxygen alone. He said that he wished practitioners would not give ether. Ether could cause death of the patient by producing acute pulmonary oedema and chloroform by necrosis of the liver. The Melbourne Women's Hospital had abandoned ether by 1915, but Dr. Ridler thought that usage might be different there now on account of the changes in staff. He thought that ether was the most foul and revolting anaesthetic to give and he would not give it to a dead dog. He realized that patients in public hospitals had to have ether, but he objected because it made patients vomit. He had seen ether given to a patient with *placenta prævia*, and when she was put up in the lithotomy position she started to vomit and blood spurted from her vagina like water out of a hose. Referring to anaesthetics in breech delivery, Dr. Ridler said that he was very interested in Dr. Mackey's comments on local anaesthesia because most general anaesthetics would stop the labour pains, as Dr. Mackey had said. In the past there had been very little anaesthesia in breech cases until gas and oxygen became available. If it was a case of extended arms there was only one anaesthetic to use and that was chloroform. Dr. Ridler did not consider that induction with ether could be quick enough. He said that if he was going to have a baby (he had had the next thing to it in the form of septicaemia from a patient with puerperal fever) he would not go into a hospital that was not equipped with gas and oxygen. He asked whether a specialist anaesthetist was ever called to give an anaesthetic for a normal labour. Dr. Ridler said that the best anaesthetist with gas and oxygen he had encountered was the matron of a hospital. She was very expert and she got the patients off quickly. The reason she was so expert was a financial one. He considered it was not the job of nurses to give anaesthetics, and a special anaesthetist was not called to give a gas and oxygen anaesthetic as it was too expensive in the ordinary cases. Dr. Ridler said that if chloroform was given in the second stage of an instrumental delivery it should not be given later for the repair of a perineum; with the second dose the uterus was liable to become relaxed and hemorrhage occurred. Chloroform should not be given to an exsanguinated patient or a shocked patient. As far as the anaesthetic for a Caesarean section was concerned, Dr. Ridler remembered, when he was a junior at Crown Street, a case in which Caesarean section was performed under spinal anaesthesia and all went well. He had a patient with a heart condition at that time and thought he would do likewise. Later he asked how the patient was and found that she was dead. He said that spinal anaesthesia was not used in cases of heart disease. Dr. Ridler referred to an article in the *British Medical Journal* which showed that a surprising number of men in England carried out spinal anaesthesia in heart disease for Caesarean section. As for analgesia, Dr. Ridler stressed the fact that the patients in the first stage were supposed to be up and walking about. Dr. Ridler was of the opinion that morphine was by far the best medicament of the lot. Dr. Paton had said that it should not be given later than two or three hours before birth and then had suggested giving it before Caesarean section.

Morphine should not be given before Caesarean section. About narcosis, the science of pharmacology afforded no means by which childbirth could be made free from the slightest discomfort or the recollection by the mother except at the cost of many dead or damaged babies. Those were his ideas on analgesia.

Dr. W. CUNNINGHAM thanked the speakers for their excellent papers. He thought that Dr. Mackey particularly should be congratulated on his results in breech cases. The methods detailed coincided with those in use at the King George V Hospital where they had had gratifying results, especially in the use of local anaesthesia for Caesarean section. However, Dr. Cunningham thought that in Caesarean section under local anaesthesia preparation for a blood transfusion should be made for those cases that might be expected to need it, and with the blood transfusion running "Pentothal" was readily administered into the transfusion tube at the time of incision of the uterus. King David probably spoke with authority when he wrote in Psalms xlviii : 6, "Fear took hold upon them there, and pain, as of a woman in travail." Dr. Cunningham said that local anaesthesia should be carefully studied especially in regard to the psychology of the patients. The patient's confidence in the accoucheur and the gentle quiet demeanour of her attendants would do much to dispel the fear which accentuated pain, and which was particularly present in a woman waiting for her operation. He referred to conversation and the clatter of instruments and said that he thought the time had come to teach nurses the psychology of labour. The Romans unfortunately called the stage of labour, when the head was crowning at the vulva, *poena magna*, "the great punishment", and this gradually with the passing of time came to mean "pain". He thought that the word "pain" should be dismissed from discussions on labour with the patient, and perhaps another word used, for example, "travail".

The most significant fact about the meeting was the need for the services of skilled anaesthetists in abnormal and indeed normal labour. In the large obstetric hospitals there should be, say, three anaesthetists, so that one would be available at any time, and they should be ready and able to carry out research and clinical trials of different forms of analgesia and anaesthesia in obstetrics. Dr. Cunningham could see no reason why sisters in charge of obstetric wards should not be specially trained in the art of administering anaesthetics for the simpler obstetric operations. No complicated obstetric operation should be done without a trained anaesthetist. He thought it was the duty of the anaesthetist, when the baby was born, to look after it and to see the airways were clear; or at least this should be done under his direction. It was Dr. Cunningham's opinion that a subcommittee of the Royal College of Obstetricians and Gynaecologists in New South Wales should investigate and direct large-scale trials of different types of anaesthesia and coordinate the efforts of all obstetric units.

Dr. J. N. R. STEPHEN said that he wished to speak from the clinical viewpoint. From his observations he would say that general anaesthesia of surgical depth was not necessary in obstetrics provided one used sufficient infiltration with local anaesthetic agents. He would like to see more local anaesthesia used in New South Wales, and speaking from his own experience of a series of thirty cases in which he had used it since October, 1943, it had a great number of uses and did not give the difficulty that Dr. Mackey had implied. For perineal infiltration Dr. Stephen used ten millilitres from a two-ounce bottle of "Parsetic" solution put up by Parke, Davis and Company. He gave half of the solution into one side of the perineal body and half into the other; that would be sufficient for an episiotomy. When the infant was being born all that was needed was a little chloroform or ether, enough to put the patient to sleep. No surgical anaesthesia was needed. For Caesarean section Dr. Mackey had said that he had had two cases in which he found it necessary to make a "T" incision to get the head out. Before the incision was made the table should be tilted to 45° off the Trendelenburg position if the head was fixed in the pelvis, and in that way the head would slide out of the pelvis and would not slip back. If one made an incision between two fingers it was possible to get hold of the head with Willett's forceps easily. During the last fifteen cases the average stay in hospital in Newcastle was twelve days. Gentleness in operation was the only necessary thing. Dr. Stephen thought that the ideal anaesthetic was the combination of local anaesthesia with a general anaesthetic given through an Oxford vaporizer. Patients liked local anaesthesia combined with 5% ether; this was pleasant to breathe in and the dose could be increased gradually, and once the baby was delivered or the head was crowned the vaporizer could



be stopped until the placenta was delivered and hæmorrhage ceased. If the patient wanted to vomit then that was all right; the muscles would contract and the baby be gradually delivered.

Dr. R. St. J. HONNER said that he thought anyone who removed an appendix during a Cæsarean section should be put in gaol. He advocated that in this matter physiology and psychology should be used more extensively instead of pharmacology. The patient's anaesthesia began at her first visit to the ante-natal clinic. Secondly, he thought there should be some effort to explain to the woman what was going to happen. The main things were the safety of the mother, the safety of the child, the comfort of the mother and the comfort of the surgeon, and one could not get full marks in all of them. The less narcosis present the better. Sir James Walton spoke of the "surgeon's ether" which he thought was the best anaesthetic, especially if given on an open mask. Despite optimistic overseas reports, spinal anaesthesia should not be used in Cæsarean section in Australia because of an occasional and unpredictable death; Dr. Honner referred to Dr. A. E. Brown's statement in this journal in 1946. Dr. Honner congratulated Dr. Mackey on his excellent paper and agreed with him entirely on the subject of local anaesthesia, as in his opinion local anaesthesia was the best form of anaesthetic for Cæsarean section. He stressed again that there should be more physiology, more psychology and less pharmacology and much gentleness.

Dr. R. B. C. STEVENSON said that he had enjoyed listening to the papers very much, and appreciated the amount of work involved. The barbiturates had been under discussion rather heavily. They were urea derivatives, and their hypnotic power depended on the number of alkyl radicals which they contained. All the barbiturates in common use were combined with sodium. Toxaemia of pregnancy was still the most common complication with which the obstetrician had to deal. It should be borne in mind that sodium was the cation chiefly involved in the extracellular fluid balance of the body, and this was disturbed in toxæmia. Sodium was the cation, and chloride was the anion. They should not lose sight of the fact that in the use of barbiturates they might be doing some harm to a toxæmic patient. It was also to be remembered that the barbiturates were detoxicated largely in the liver, but immediately the dose went beyond the average small dose there were two effects which had not been mentioned. One effect was on the hypothalamic-pituitary mechanism inhibiting water diuresis, and the second was the effect on the vessel walls indirectly producing oliguria, if not anuria. These two points should be kept in mind. Chloral hydrate should not be forgotten. The Stroganoff figures for the treatment of eclampsia still stood out as among the most remarkable ever published, and Stroganoff used chloral hydrate. About local anaesthesia, Dr. Stevenson endorsed heartily what had been said. One speaker had said that local anaesthesia should be used in all cases of Cæsarean section. That was rather a sweeping statement. He had performed many Cæsarean sections under local anaesthesia, but he still approached with diffidence those patients who had undergone previous Cæsarean or other sections. One often found troublesome adhesions with which it was impossible to deal adequately with local anaesthesia. If local anaesthesia was used, preparation should be made in advance for "Pentothal" or some other intravenous anaesthetic to be given at short notice if required.

Dr. S. V. MARSHALL said that he would like to thank the speakers for the papers. He had learned quite a lot and also he was very glad to see the anaesthetists combining so usefully with the obstetricians. They (the obstetricians) were at least taking some notice of modern advances and not just sticking to chloroform. He said that he would like to ask Dr. Mackey if he used any adrenaline in the local mixture and how this affected the use of chloroform later on. The various discussions had been interesting, if somewhat opposed to one another and sometimes indicative of extreme views. Dr. Marshall thought that the answer was that all anaesthetics had their place, varying with the circumstances. To say that local was the only form of anaesthesia to be used was altogether too absurd and the same thing applied to gas. It was high time anaesthetists and obstetricians combined to work out a better form of treatment in the way of anaesthetics for women. The idea of a resident anaesthetist on the staff was a good one, but the idea of nurses giving anaesthetics was bad. Dr. Marshall noted that Dr. Mackey referred to continuous caudal anaesthesia, and as this form of anaesthesia had flourished a few years ago and then died, he would be very interested to know the reason. Dr. Marshall again expressed his appreciation of the papers.

Dr. H. J. DALY said that Dr. Paton's paper was interesting, but that he would rather read it slowly, in print, fully to digest many points which concerned anaesthetists. Dr. Mackey's paper had dealt with local anaesthesia in obstetrics and in Cæsarean section. At the present time the anaesthetist had very little to do with local anaesthesia. The specialist anaesthetist was seldom called in to give the anaesthetics for ordinary obstetrics; but he should be. The obstetrician usually had plenty of time and a skilled anaesthetist could save him much anxiety in a difficult case. Dr. Daly asked Dr. Mackey how much "Pentothal" he gave as a supplement to local anaesthesia for Cæsarean section. Dr. Daly thought that the "Pentothal Sodium" might be sufficient without the local anaesthesia in Cæsarean section. Dr. Daly thought that the method of anaesthesia described by Dr. Mackey was rather difficult and somewhat complicated. A new era had been opened up by Dr. Mackey's presence at the Women's Hospital, Crown Street; it showed that great interest was being taken by obstetricians in improving anaesthesia in obstetric hospitals. Dr. Ridler had said that he would not give ether to a dead dog. Dr. Daly thought that ether was by no means dead from the obstetrician's point of view. He had given it in a number of cases of Cæsarean section, with uniformly good results. Dr. Ridler had said that gas and oxygen was the best form of anaesthesia in obstetrics. Dr. Daly thought that Dr. Ridler should not say gas and oxygen, but oxygen and gas. The great danger in obstetrics was not giving enough oxygen. That was the risk when a nurse gave the anaesthetic to a parturient patient. If gas and oxygen anaesthesia was to be used and a specialist anaesthetist was not present, it could have its dangers. Chloroform was still used and would still be used by many men in the country without the facilities of a modern hospital. It was a good analgesic and acted quickly. If it was used over a long period it might have bad effects on mother and child; but it still had a place and would continue to have a place. Sir James Simpson had first discovered the use of chloroform, and Oliver Wendell Holmes was credited with having invented the word "anaesthesia". Holmes was said to have suggested, in order to ridicule Simpson, that each bottle of chloroform should bear the words: "Does your mother know you're out?"

Dr. G. B. LOWE said that the papers had been interesting and that he would like to have time to study them at his leisure. He gave a warning about gas and oxygen anaesthesia; he wanted practitioners to realize that it was not fool-proof. It was impossible always to have a specialist anaesthetist for obstetrics; one could not call these specialists out of bed at all times of the night, and if they were wanted in an emergency they would very likely be away doing something else. Gas and oxygen should be given only by a very skilled anaesthetist; he would not like the audience to think this form of anaesthesia as easy as had been suggested. In some instances its administration really amounted to the administration of ether by the "closed" method. It was mostly given by various members of the resident staff, all looking for experience—a case of the blind leading the blind. When one investigated what they were giving, one found that they were cutting out the gas and really giving ether in a kind of Clover's inhaler. Gas and oxygen anaesthesia should not be thought innocuous; Dr. Lowe had had at least one patient succumb to it. They had all seen patients who had been given ether by the "open" method vomit and inhale some of the vomitus. What kind of anaesthesia was the obstetrician to use? Chloroform was taboo at the university; none the less, it was still a good anaesthetic agent if one could find somebody to give it. None of the young graduates had been taught to use chloroform. After that night's discussion it would appear that the obstetrician could not give gas and oxygen, he could not give ether, he could not give chloroform, someone said that the barbiturates should not be used and morphine had been practically "wiped" at the meeting. If morphine was used blue babies would be born; but if the staff understood them, blue babies would survive. Dr. Lowe had long since abandoned morphine in general as an analgesic. After the barbiturates also blue babies would be born; but the barbiturates were extremely useful, and after long experience of them in a great number of cases Dr. Lowe thought them almost fool-proof. As an analgesic, up to the moment "Nembutal" was the best of the lot. Although he had given "Pethidine" in a number of cases, he could not make up his mind that it was really of great value, though his colleagues seemed to consider it was a useful drug. He was doubtful about its ability to abolish cervical spasm even in large doses. Referring to the Small machine, Dr. Lowe said that it was never designed for the induction of anaesthesia. Patients were likely to become

cyanosed and had a great amount of mucus and were apt to vomit; the machine was not good for the induction of anaesthesia. It was useful for the patient to play with and perhaps drop on the floor. If the patient had a suitable temperament so that she could inhale through the machine, or if she had a "special" to help her, the apparatus was useful, but it really was not very good for the induction of anaesthesia. The patient had to breathe a lot into the long tube of the machine and became anoxicemic. The method was not ideal for the patient. Dr. Paton had referred to the high incidence of forceps deliveries in association with some of these drugs. Dr. Lowe wondered whether it was justifiable to put forward ideas on that point that might be erroneous. The deliveries referred to were mostly effected in hospitals. The incidence was greater there because the resident medical officers and students had to be taught how to carry out forceps deliveries. Forceps deliveries were common in America. He thought Greenhill stated that he delivered most of his patients with low forceps under anaesthesia. The fact that about 35% of deliveries were effected by forceps did not mean that that method was really required. Statistics were collected from the large hospitals, where every type of parturient patient was admitted. For example, statistics showed that in about 3% of cases the fetus presented by the breech, but that would be a greater percentage than occurred in general practice. The proportion of forceps deliveries was greater in these hospitals than in private practice because they were teaching hospitals.

Dr. GRACE CUTHBERT thanked Dr. Paton and Dr. Mackey for their papers. She thought that those present might be interested to know something of the action taken on the question of anaesthesia in the toxæmias by the Special Medical Committee Investigating Maternal Mortality, which had been meeting over the last nine years. It could be assumed from the present discussion that violent controversies had taken place over the years, and, as a result, the committee decided that some practical step should be taken to solve the problem.

Early last year letters were written to the chairmen of the medical boards of six of the public maternity hospitals—the Royal Hospital for Women, the Women's Hospital (Crown Street), the King George V Memorial Hospital for Mothers and Babies, the Royal North Shore Hospital, Saint Margaret's Hospital and Saint George District Hospital—asking that the honorary medical staff make investigation or institute research into anaesthesia in toxæmic parturient women.

Many of the deaths from toxæmias reported to the committee were preventable. Recently those hospitals had been asked that their representatives should meet to coordinate their investigations in the light of experience already gained.

Dr. N. W. BARTROP referred to spinal anaesthesia; he said that it had been commended and condemned. No explanation had been given of why it had failed in Caesarean section. Dr. Bartrop had heard the opinion expressed elsewhere that spinal anaesthesia in Caesarean section was the same as spinal anaesthesia in the presence of any other large abdominal tumour—a cyst, a collection of fluid *et cetera*. The patient was put in the Trendelenburg position and the action of the diaphragm was just about cut out. In an occasional spinal anesthetic the anesthetic fluid did not remain fixed in the lower segments where the analgesic action was wanted, but slipped up past the level of the eighth thoracic vertebra, and might affect all other intercostal muscles. Thus the diaphragm had been put out of action by the mechanical effect of the large abdominal tumour, and the abdominal muscles had been cut out by the spinal anaesthesia, and no means of ventilating the lungs remained.

Dr. Mackey, in reply, thanked the speakers for their remarks. He said that the question of chloroform had arisen. At Crown Street they had found that the best anesthetic agent for the delivery of normal *primiparae* was chloroform; they all were given this form of anaesthesia by the resident medical officers. For *multiparae* Small's ether machine was used; it was safe and satisfactory for the delivery of the head. Chloroform was not given to *primiparae* until the head was crowned on the perineum. Dr. Mackey agreed with Dr. Ridler that chloroform anaesthesia was the only form of anaesthesia to use in delivery of a fetus presenting by the breech when complications occurred. Quick anaesthesia was essential, and chloroform was satisfactory; it did not endanger the fetus by slowness of action. Referring to nitrous oxide and oxygen anaesthesia, Dr. Mackey said that at Crown Street they had a number of "Austox" machines; he did not lay it down that they should

be used for eclampsies. It was rather difficult to adjust the level of anaesthesia with these machines. Sometimes somebody did not understand the machine. At Crown Street they had lately found, despite the critics, that chloroform anaesthesia was one of the quickest and safest methods of controlling the convulsive seizures of eclampsies. In reply to Dr. Cunningham, Dr. Mackey said that he was pleased that the gospel of local anaesthesia had spread to the King George V Memorial Hospital. He knew that Dr. Cunningham was a firm adherent of nerve block and all its implications in obstetrics. He did not propose to go into details of techniques, blood transfusion *et cetera*; he assured Dr. Cunningham that the normal standards were observed at Crown Street as at the King George V Hospital. With regard to the techniques of local anaesthesia, Dr. Mackey said that he took it that the audience would be sufficiently conversant with them. In reply to Dr. Marshall, Dr. Mackey said that in Caesarean section five minims of adrenaline to a 500 millilitre flask of "Metycaine" solution were used. The question of bad effects from the use of adrenaline and the later administration of chloroform did not arise. Only six to eight weeks previously the subject had been brought up at the hospital. If the baby was premature, if the patient was an eclamptic, if episiotomy was necessary, and in breech deliveries adrenaline was not used in the local anesthetic solutions. A 1.5% solution of "Metycaine" produced an effect lasting up to forty-five minutes. Referring to caudal anaesthesia, Dr. Mackey said that it had its limitations. One of the most important was the time factor. To use caudal anaesthesia for the relief of pain during labour required somebody to go to the patient every forty-five minutes at first, and later every twenty minutes. If one began caudal anaesthesia, one could look forward to thirteen or fourteen hours of labour with it. The other big consideration was that every year 5000 to 6000 babies were born at Crown Street, and that did not allow time for the study of caudal anaesthesia. It was used occasionally, particularly in cases of cervical dystocia. Dr. Mackey believed that the injection of eight millilitres of solution into the caudal canal was the ideal method for such delivery, better than pudendal block. It produced complete relaxation. Dr. Daly had wondered whether the anesthetic effect in Dr. Mackey's method might not have been produced by the "Pentothal" used. Dr. Mackey said that it took approximately one gramme of "Pentothal", but patients who had a lot of circulating or fixed local anesthetic agent in their systems required more. Dr. Mackey agreed with Dr. Lowe's remarks about chloroform and about Small's ether machine. Referring to the incidence of forceps deliveries, Dr. Mackey said that of the series quoted by Dr. Paton, in the delivery of about 34% of *primiparae* forceps had been used; it would have been impossible to avoid the use of forceps—the patients were completely drugged. "Pethidine" had not been mentioned very much. Dr. Mackey said that it was in common use at Crown Street, and had been found to be a good analgesic with not much amnesic effect. It was best used in combination with the barbiturates or potassium bromide and chloral. It should never be used until the patient was well established in labour. On some occasions "Pethidine" had been given early in labour, and one patient had ruptured membranes for seven days before eventually being delivered of a dead fetus. Dr. Mackey said that he had seen "Pethidine" given to a patient at 2 a.m. for Caesarean section made necessary by disproportion; the patient had gone completely out of labour, and had come back into labour at 8 a.m. If fifty milligrammes of "Pethidine" produced no untoward effects, the patient being well established in labour, then 100 milligrammes could be given. Further dosage was 100 milligrammes repeated as occasion arose to a total dosage of 300 milligrammes. Dr. Cuthbert had spoken about the deliberations of the committee on maternal mortality. Dr. Mackey said that he only wished that its meetings were made more public. He had attended similar types of meetings in America; such meetings offered the greatest opportunities for post-graduate teaching. In conclusion, Dr. Mackey expressed his thanks to the members of the honorary medical staff of the Women's Hospital, Crown Street, who had generously allowed him to use the material which he had presented.

Dr. C. N. PATON, in reply to Dr. Ridler, said that it would be admirable if someone was on the spot all the time to give satisfactory nitrous oxide and oxygen anaesthetics for deliveries. But the technique was difficult to learn, and many anaesthetists even after many years' practice had to add some adjuvant. Dr. Paton did not think that nurses could be trained to do the work satisfactorily without further instruction in physiology and pharmacology. But the obstetricians themselves could do it with training and

practice. Referring to spinal anaesthesia, Dr. Paton said that the illustration given had borne out the remarks made in his paper. Poor results due to "failed solution" and "faulty technique" had occurred before sufficient was known about the method. Dr. Honner had said that spinal anaesthesia had no place in obstetric surgery in Australia; Dr. Paton could not agree with that view. With regard to reports on spinal anaesthesia in obstetrics, Dr. Paton pointed out that most of the spinal anaesthetics were given by the obstetricians themselves, in some instances to patients to whom the specialist anaesthetist would not consider giving spinal anaesthesia. If the patients were carefully selected and the criteria faithfully adhered to, spinal anaesthesia was a safe procedure. Dr. Paton had used it himself on many occasions, and in a large number of cases no difficulty at all had been experienced. Dr. Cunningham had referred to the psychological aspect of analgesia and anaesthesia; Dr. Paton agreed that this should be emphasized. As Dr. Honner had suggested, it should be put at the beginning and not at the end of their handling of the patient. He had mentioned it at the end of his paper because he had discussed the subject in historical sequence. Dr. Cunningham had referred to the bad effect of the word "pain" and had suggested that "travail" should be used instead; Dr. Paton thought that the word "travail" might be understood at the King George V Hospital, but was sure that it would not be understood at the Women's Hospital, Crown Street. He agreed with Dr. Cunningham that the anaesthetist should take first place in the resuscitation of the infant. He himself always insisted on taking care of the infant at once. The responsibility should be that of the anaesthetist, who was the only doctor present not aseptically prepared and the only one trained in resuscitation. Sometimes Dr. Paton himself performed a full tracheo-bronchial toilet; he was sure that many babies had been saved by this means from lobular collapse, atelectasis and pneumonia. It was idle to say that local anaesthesia was the only suitable form of anaesthesia. In his paper Dr. Paton had tried to catalogue the various types of patients coming before the anaesthetist and to show that no one form of anaesthesia could possibly fit all these types of cases. On some occasions local anaesthesia would be absolutely impossible. Dr. Lowe seemed frightened of nitrous oxide and oxygen, and complained that some anaesthetists really removed the gas and carried on with ether and rebreathed oxygen. Dr. Paton said that that was not his idea when he mentioned nitrous oxide and oxygen with ether as an adjuvant. In the procedure mentioned by Dr. Lowe, in which nitrous oxide and oxygen alone was used, to reach a desirable concentration of nitrous oxide, one would have to reduce the oxygen below a safe level. The right way was to add the adjuvant and increase the oxygen proportion to a safe level. Only a few drachms of ether were needed. Reference to vomiting, salivation and retching had been made by several speakers. Dr. Paton suggested that the occurrence of these symptoms was not always due to the type of anaesthesia, but to over-activity of the parasympathetic reflexes. Vagus activity was at its maximum; when some overflow of impulses occurred, the parturient woman was prone to gagging, vomiting, retching, laryngospasm *et cetera*. Dr. Paton would not condemn a form of anaesthesia because of salivation or vomiting. Dr. Bartrop had referred to spinal anaesthesia and suggested reasons why it was not successful. Dr. Paton said that many reasons had been suggested. The most popular amongst obstetricians was that the large amount of blood in the splanchnic vessels prevented its distribution over remote parts of the body, and so the parturient woman suffered from cerebral anoxia. But Dr. Paton still thought that the bad results were due to failures in technique.

Dr. Grieve, from the chair congratulated the Section of Obstetrics and Gynaecology and the Section of Anaesthesia of the New South Wales Branch of the British Medical Association, who had been responsible for arranging the meeting, which had proved successful by the excellence of the papers, the liveliness of the discussion and the satisfactory attendance. Dr. Grieve said that from time to time as he had listened to and taken notice of the extraordinary conflict of views on one detail and another, and heard almost every single treatment and method of procedure condemned, he had felt that nothing he had ever done in obstetric practice had been right. Perhaps it was not quite as bad as that; but it was important after such a discussion to pick out a few points for guidance in the future. Dr. Grieve hoped that those present would always remember at every stage that the business of a woman in labour was to have a child, so that, whatever the analgesics or anaesthetics used, there should be the least possible interference with the normal cycle of uterine contractions. That was the best lesson of all to learn.

## Post-Graduate Work.

### THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

#### ANNUAL GENERAL COURSE.

##### Film Programme.

THE Post-Graduate Committee in Medicine in the University of Sydney announces that the following films will be shown on Wednesday, November 19, 1947, at 4.30 p.m., in the Stawell Hall, 145, Macquarie Street, Sydney: "Coramine" and "Intragastric Drip Therapy in Peptic Ulcer".

##### Overseas Lecturers.

It is expected that during December, Dr. Earl R. Carlson, of New York, United States of America, who has devoted his life to the cause of infantile cerebral palsy, will be visiting Sydney at the invitation of the Spastic Centre, Mosman. During his short visit arrangements will be made for Dr. Carlson to give a lecture to the medical profession. In addition a clinical meeting with case demonstrations by Dr. Carlson will be held at the Spastic Centre, in association with the Australian Orthopaedic Association and the Sections of Orthopaedics, Neurology, Psychiatry and Neurology and Paediatrics of the New South Wales Branch of the British Medical Association.

Dr. Carlson, who is himself a victim of cerebral palsy, will be visiting Sydney after the completion of a lecture tour in New Zealand.

It is not yet known when Dr. Carlson expects to arrive in Australia, but further details will be announced when available.

##### COURSE IN PÆDIATRICS.

A course in paediatrics will be held at the Royal Alexandra Hospital for Children, Camperdown, Sydney, for two weeks beginning December 8, 1947. The course will consist of ward rounds, special lectures and demonstrations, and early application is advisable. Fee: £5 5s.

##### COURSE FOR GENERAL PRACTITIONERS.

The Post-Graduate Committee has decided to reinstitute the intensive course for general practitioners, which has not been held for some years. This course will begin on May 24, 1948, for two weeks, the fee being £5 5s.

## Special Correspondence.

### NEW ZEALAND LETTER.

#### FROM OUR SPECIAL CORRESPONDENT.

THE 1947 session of Parliament, the first of the Labour Government elected by a small majority in November, 1946, is drawing to a close. No major matters to do with health services were enacted, but a number of events are worth recording.

During the year the portfolio of Health was relinquished by the Honourable A. H. Nordmeyer, who had held it for six years, and who took over Industries and Commerce and Supply. His successor was the Honourable Mabel Howard, the first woman cabinet minister in New Zealand.

The hospital boards were given power in an amending act to establish health centres. The exact purpose of this is not clear, and there is so far no sign of the new power being used.

Regarding medical practice under social security, no major reforms have been mooted. A series of committees—comparable to those under Sir Will Spens in Britain—have been set up to advise about status, remuneration *et cetera* for different categories of workers, part-time visiting physicians and surgeons, full-time hospital employees, nurses *et cetera*.

Recently also a joint committee of the Health Department and of the New Zealand Branch of the British Medical Association has been empowered to study present workings of medical and pharmaceutical benefits with a view to overcoming certain obvious anomalies and abuses. The committee is composed of Mr. Von Kelsenberg, Dr. Duncan Cook and Dr. L. C. McNickle from the department, and Dr. W. F.



Buist, Dr. D. S. Wylie and Dr. E. D. Pullon from the British Medical Association.

Dr. T. R. Ritchie, who had been acting since the retirement of Dr. M. H. Watt, has been appointed Director-General of Health. Dr. C. A. Taylor, head of the Tuberculosis Division, has recently returned from extensive travel overseas and is planning a vigorous campaign.

The Local Government Commission, under Mr. Justice Goldstone, has just held sessions in Whangarei, investigating proposals for the amalgamation of the six hospital boards in the Northland Peninsula. Great interest, both local and general, was shown in the various submissions. The findings have not yet been made public.

## Correspondence.

### SURGICAL GLOVE POWDER.

SIR: Your "Current Comment" on the effect of talc powder as a lubricant for surgical gloves in the issue of October 18, 1947, is more than timely, particularly in view of the extensive literature which is being built up on this subject. Roberts lists 27 articles on the subject. We now have an explanation for those many abdominal cases which should not have produced adhesions, but in which, on subsequent operation, we so often find quite dense ones. Especially significant is the statement made by Weed and Groves that in 75% of all operations a tear or puncture of surgical gloves occurs; and that of Seelig that talc can be removed from the outer surface of gloves only with the greatest difficulty.

Your comment refers solely to the work of C. Marshall Lee and Edwin P. Lehman in the use of starch as an alternative to talc. No suitable starch powder is available in Australia, but Seelig's suggestion that potassium bitartrate is the most suitable substitute for talc, being soluble and absorbed without eliciting any reaction, has been adopted here and proved most satisfactory, although it must be admitted that insufficient time has elapsed to indicate whether abdominal adhesions could or could not be traced to its use. The potassium bitartrate used was commercial cream of tartar, and is now available.

It has been found that as a lubricant it is superior to talc. It has been used in a "salt shaker", the potassium bitartrate being placed in the "salt shaker" or a tin with a perforated lid and autoclaved. It retains its powder form after autoclaving without any "caking". It has been found unnecessary to lubricate the inner surface of the glove; so long as the hands are dry a small quantity placed over the hands and rubbed in enables the gloves to be slipped on noticeably easier than if talc had been used.

An unexpected feature was noted by the theatre sister who stated that when talc was used as a lubricant for gloves there was always a fine film of dust over everything in the theatre. This was absent with the potassium bitartrate.

Yours, etc.,  
MERVYN HALL.

421, Ruthven Street,  
Toowoomba,  
Queensland.  
October 30, 1947.

### MUNITIONS SUPPLY LABORATORIES' BIBLIOGRAPHIES.

SIR: One of the functions of the Munitions Supply Laboratories' Information Service is the production of summaries of information in response to requests. During the last few months several bibliographies have been prepared and are available free of charge to all interested.

The following bibliography has been prepared by the Munitions Supply Laboratories' Information Service. Copies may be obtained on application to the Superintendent, Munitions Supply Laboratories, Private Bag No. 4, Post Office, Ascot Vale, W.2.

Bibliography No. 11. "Medical Treatment of Chlorine Poisoning." This survey has been prepared as a result of an inquiry received by Munitions Supply Laboratories for recent information on the above subject. The inquirer was already familiar with standard publications referring to this subject (such as official manuals relating to gas warfare, standard books on the same subject *et cetera*) where, in general, advice on medical treatment by administering oxygen, with venesection in cases of acute effects on the blood stream, are normally recommended. Much of this

information dates back to experience in the 1914-1918 war, and the inquirer desired a survey of more recent developments, particularly advice on first aid and early treatment of poisoning cases, prior to hospitalization.

Applicants should state the reason for which the publication is requested. The date of preparation of the bibliography appears on the cover, and inquiries for later or fuller information are welcomed.

Yours, etc.,

A. E. DAWKINS,

Acting Superintendent.

Munitions Supply Laboratories,  
Ascot Vale, W.2,  
Victoria.  
October 27, 1947.

### THE DIAGNOSIS OF PNEUMONOKONIOSIS.

SIR: In medico-legal cases, some radiologists state that a pneumonokoniosis is present from the examination of X-ray films which do not show a "nodular" fibrosis.

The radiologist is not justified in saying that "increased reticulation" or "linear fibrosis" is due to the inhalation of dust. The former occurs in many individuals, especially asthmatics, who have never been exposed to a dust hazard, while the latter is a usual change in middle-aged workers. Radiologists working among miners are apt to consider these conditions to be due to dust inhalation, but they would find that they are just as common in railway fitters and field labourers.

Advanced anthracosis, that is, the deposit of coal dust in the lungs, does not cause any distinctive change in an X-ray film. After many years of work the coal miner may develop a nodular fibrosis, due to the action of the small amount of silica present in the coal mine dust. These small amounts would have no effect on a normal lung, but where the lymphatic circulation is blocked by coal dust, they may eventually cause a nodular fibrosis.

The diagnosis of pneumonokoniosis apart from silicosis should be left to the physician who would base his opinion on the disability occurring from dyspnoea, emphysema, restricted chest expansion *et cetera*, which occur in these workers.

Yours, etc.,

J. G. EDWARDS.

185, Macquarie Street,  
Sydney,  
November 3, 1947.

## University Intelligence.

### THE UNIVERSITY OF MELBOURNE.

#### ELECTION OF THE UNIVERSITY COUNCIL.

THE Registrar of the University of Melbourne announces that an election of five members of the University Council by convocation (the graduates of the university) will take place on December 13, 1947. Seven nominations have been received: Mr. J. R. Darling, M.A., Mr. C. M. Gilray, M.C., M.A., Mr. W. Russell Grimwade, C.B.E., B.Sc., Mr. L. F. Loder, M.C.E., Mr. Justice C. J. Lowe, M.A., LL.B., Sir Alan Newton, M.B., M.S., Mr. G. Shaw, B.A., LL.B., M.B., B.S.

Voting papers will be sent to graduates who apply for them not later than December 1 and must be lodged before noon, December 13, 1947.

## Naval, Military and Air Force.

### APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 207, of October 30, 1947.

#### CITIZEN NAVAL FORCES OF THE COMMONWEALTH.

##### Royal Australian Naval Reserve: Retired List.

The appointment of Surgeon Commander Harold Henry Field-Martell as District Naval Medical Officer, Fremantle, is terminated, dated 31st July, 1947.

*Royal Australian Naval Volunteer Reserve.*

Daintrey Ned Kekwick is appointed Surgeon Lieutenant with seniority in rank of 28th September, 1943, dated 1st August, 1947. Surgeon Lieutenant Daintrey Ned Kekwick is appointed District Naval Medical Officer, Fremantle, dated 1st August, 1947.

To be Surgeon Lieutenants.—Stewart Horton Delbridge Preston, 13th August, 1946, seniority in rank 28th July, 1942; Edward Winston Freshney, 11th November, 1946, seniority in rank 12th December, 1942; Peter Ronald Brett, 1st January, 1947, seniority in rank 5th October, 1943.

**Obituary.****CYRIL BERESFORD HOWSE.**

We are indebted to Dr. J. T. Paton for the following appreciation of the late Dr. Cyril Beresford Howse.

Cyril Beresford Howse, known always as Jack, was born in London seventy-five years ago. He was the youngest child in a large family, his father was a general practitioner



in a busy part of the city, and his mother was a member of the well-known Beresford family. He was educated at one of the Guild Schools, and he decided, as did also three of his brothers, to follow his father's profession. He qualified at the University of London in 1894 and was a resident medical officer at the London Hospital and in due course senior resident officer at the Poplar Hospital. He had started to read for the F.R.C.S. when the Boer War broke into his work and he served as a regimental medical officer throughout that campaign. On his return he recommenced his surgical studies while working as a resident medical officer at the London Hospital, where he was assistant for some time to Sir Frederick Treves; he took his Fellowship in 1905 in brilliant style, his name being at the top of the list. This entitled him almost automatically to an honorary position on one of the big London hospitals, but he hankered after country life and started practice at Newquay in Cornwall. In 1908 his brother Neville persuaded him to come and join him in practice at Orange, New South Wales, where he spent the next thirty-nine years. Sir Neville and he were the first exponents of modern abdominal surgery in the west of New South Wales, where they quickly established a remarkable reputation. In 1930 C. B. Howse was elected a foundation fellow of the Royal Australasian College of Surgeons. He had excellent judgement and used a clear and direct approach to surgical problems; he was a deft and skilful surgeon, and endeared himself to his patients by his unremitting interest in and anxiety about their welfare. He was loved and trusted by his colleagues. He married

Miss Marjorie Bowman in 1915; there were five children of the marriage, one of whom, Richard, died as a prisoner of war in 1944. He was intensely interested in all town activities and most of the successful organizations of the growing young city owed a great deal to his work and generosity; at the time of his death he was patron of the Orange Branch of the Returned Sailors, Soldiers and Airmen's Imperial League of Australia, Orange District Jockey Club, Orange District Golf Club and the Orange District Tennis Association. He was Government Medical Officer from 1927 till his death on September 19, 1947. He is survived by his wife, two sons and two daughters.

ROBERT THOMSON.

We regret to announce the death of Dr. Robert Thomson, which occurred on October 7, 1947, at Brisbane.

**Australian Medical Board Proceedings.****NEW SOUTH WALES.**

THE undermentioned have been registered, pursuant to the provisions of the Medical Practitioners Act, 1933-1939, of New South Wales, as duly qualified medical practitioners:

- Muston, William Barnes, M.B., B.S., 1947 (Univ. Sydney), Royal Perth Hospital, Perth, Western Australia.  
 Nordstrom, Leslie Leonard, M.B., B.S., 1947 (Univ. Sydney), Balmain and District Hospital, Balmain.  
 Nuffield, Edward Joseph Alexander, M.B., B.S., 1947 (Univ. Sydney), St. George District Hospital, Kogarah.  
 Parry, Daphne Ruby Joyce, M.B., B.S., 1947 (Univ. Sydney), General Hospital, Brisbane, Queensland.  
 Petinger, Douglas Firth, M.B., B.S., 1947 (Univ. Sydney), Sydney Hospital, Sydney.  
 Prentice, David Hugh, M.B., B.S., 1947 (Univ. Sydney), Royal Perth Hospital, Perth, Western Australia.  
 Ralston, Mary, M.B., B.S., 1947 (Univ. Sydney), General Hospital, Launceston, Tasmania.  
 Reeve, Thomas Smith, M.B., B.S., 1947 (Univ. Sydney), District Hospital, Marrickville.  
 Reid, Colin Campbell, M.B., B.S., 1947 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.  
 Relf, Lawrence Lardner, M.B., B.S., 1947 (Univ. Sydney), Ryde District Soldiers' Memorial Hospital, Eastwood.  
 Richardson, Eleanor Mary, M.B., B.S., 1947 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.  
 Roarty, John Stanislaus, M.B., B.S., 1947 (Univ. Sydney), Lewisham Hospital, Lewisham.  
 Rumore, Anthony, M.B., B.S., 1947 (Univ. Sydney), Sydney Hospital, Sydney.  
 Sabel, Verleen Mary, M.B., B.S., 1947 (Univ. Sydney), District Hospital, Goulburn.  
 Schofield, James Alexander Vindin, M.B., B.S., 1947 (Univ. Sydney), Royal North Shore Hospital, St. Leonards.  
 Sinclair, Bruce Alexander, M.B., B.S., 1947 (Univ. Sydney), District Hospital, Wollongong.  
 Smith, Alexander Hylton, M.B., B.S., 1947 (Univ. Sydney), District Hospital, Maitland.  
 Smith, Thomas Bruce, M.B., B.S., 1947 (Univ. Sydney), St. Vincent's Hospital, Darlinghurst.  
 Spence, Robert Kinross, M.B., B.S., 1947 (Univ. Sydney), Balmain and District Hospital, Balmain.  
 Stevenson, Malcolm Keith, M.B., 1947 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.  
 Swan, Charles Russell, M.B., B.S., 1947 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.  
 Taperell, Quentin John, M.B., B.S., 1947 (Univ. Sydney), District Hospital, Parramatta.  
 Tarn, Joseph Henry Teesdale, M.B., B.S., 1947 (Univ. Sydney), Royal South Sydney Hospital, Zetland.  
 Tink, Arnold Richard, M.B., B.S., 1947 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.  
 van Dugteren, Noel Rothero, M.B., B.S., 1947 (Univ. Sydney), District Hospital, Manly.  
 Walker, Reginald Gordon, M.B., B.S., 1947 (Univ. Sydney), Eastern Suburbs Hospital, Waverley.  
 Walter, Clement Jack, M.B., B.S., 1947 (Univ. Sydney), Sydney Hospital, Sydney.  
 Watkins, George Bertram, M.B., B.S., 1947 (Univ. Sydney), Sydney Hospital, Sydney.

- Westaway, Leslie, M.B., B.S., 1947 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.  
 Wolfers, Philip Benjamin, M.B., B.S., 1947 (Univ. Sydney), District Hospital, Wollongong.  
 Boyd, Stanley, L.R.C.P. (London), M.R.C.S. (England), 1911, Valley Road, Wentworth Falls.  
 Buchanan, William Frederick, L.R.C.P. (London), M.R.C.S. (England), 1943, c.o. University Club, Sydney.  
 Finger, Alan Henry, M.B., B.S., 1934 (Univ. Melbourne), D.P.H., 1941 (Univ. Sydney), Patton Street, Broken Hill South.  
 Gott, Henry, L.R.C.P. (London), M.R.C.S. (England), 1888, M.B., B.S., 1890 (Univ. Durham), 98, Shirley Road, Wollstonecraft.

The following additional qualification has been registered:

- McGarrity, Kelvin Alexander, 215, Macquarie Street, Sydney (M.B., B.S., 1931, Univ. Sydney), M.R.C.O.G., 1937.

### Corrigendum.

Dr. A. J. KING, of Perth, writes that he has been wrongly reported in the discussion on the problems of mass radiography at the meeting of the Australian and New Zealand Association for the Advancement of Science, of which an account was given in our issue of October 18, 1947. The statement in the third line of the second column of page 490 should read "It was known that 20% to 40% of all persons admitted to hospital had tuberculosis at some stage of development."

### Medical Appointments.

Dr. J. Coffey has been appointed to represent the Government as Assessor with the Medical Assessment Tribunal, in pursuance of the provisions of *The Medical Acts*, 1939 to 1940, of Queensland.

Dr. J. T. Cullen has been appointed medical officer of health, County of Yancowinna, and medical officer in charge, Bureau of Medical Inspection, Broken Hill, New South Wales.

Dr. Arthur John Metcalfe has been appointed Director-General of Health and Director of Quarantine, Department of Health, Canberra.

### Books Received.

"School Health and Health Education: With Special Consideration of the Teacher's Part in the School Health Program", by C. E. Turner, A.M., Ed.M., D.Sc., Dr.P.H., with the editorial assistance of C. Morley Sellers, M.D.; 1947, St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 8½" x 5½", pp. 458. Price: 26s.

"Skin Manifestations of Internal Disorders (Dermadromes)", by Kurt Wiener, M.D.; 1947, St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 8½" x 6½", pp. 690, with many illustrations, some of them coloured. Price: 94s.

"Handbook of Chest Surgery for Nurses", by J. Leigh Collis, B.Sc., M.D., F.R.C.S., in collaboration with L. E. Mabbitt, S.R.N., foreword by A. Tudor Edwards, M.D., M.Chir., F.R.C.S.; Second Edition; 1946. London: Baillière, Tindall and Cox. 8" x 5½", pp. 196, with many illustrations. Price: 7s. 6d.

"A Handbook for Nursery Nurses", by A. B. Meering, S.R.N., with a foreword by Alan A. Moncrieff, M.D., F.R.C.P.; 1947. London: Baillière, Tindall and Cox. 8" x 5½", pp. 522, with many illustrations. Price: 17s. 6d.

"Woman Unknown", by George Grange, M.B., B.S.; 1947. Sydney and London: Angus and Robertson. 7½" x 5", pp. 118. Price: 5s.

"Pasteurisation", by Harry Hill, F.R.San.I., A.M.I.S.F., F.S.I.A.; Second Edition; 1947. London: H. K. Lewis and Company, Limited. 8½" x 5½", pp. 304, with many illustrations. Price: 21s.

"Developmental Diagnosis: Normal and Abnormal Child Development: Clinical Methods and Pediatric Applications", by Arnold Gesell, M.D., and Catherine S. Amatruda, M.D.; Second Edition; 1947. New York and London: Paul Hoeber Incorporated. 9½" x 6", pp. 514. Price: \$7.50.

"Retropubic Urinary Surgery", by Terence Millin, M.A., M.Ch. (Dublin), F.R.C.S., F.R.C.S.I.; 1947. Edinburgh: E. and S. Livingstone, Limited. 9½" x 7", pp. 216, with many illustrations, some of them coloured. Price: 25s.

"Radium Dosage: The Manchester System", edited by W. J. Meredith, M.Sc., F.Inst.P.; 1947. Edinburgh: E. and S.

Livingstone, Limited. 9½" x 7½", pp. 134, with illustrations. Price: 15s.

"Morphologic Hematology", editor-in-chief, William Dameshek, M.D.; Special Issue No. 1 of *Blood, The Journal of Hematology*; 1947. New York: Grune and Stratton. 10" x 7", pp. 208, with illustrations. Price: \$4.75.

"Personal Mental Hygiene", by Dom Thomas Verner Moore, O.S.B., M.D., Ph.D.; 1947. London: William Heinemann (Medical Books), Limited. 8½" x 5½", pp. 340. Price: 21s.

### Diary for the Month.

- Nov. 17.—Victorian Branch, B.M.A.: Finance Meeting.  
 Nov. 18.—New South Wales Branch, B.M.A.: Medical Politics Committee.  
 Nov. 19.—Western Australian Branch, B.M.A.: General Meeting.  
 Nov. 20.—Victorian Branch, B.M.A.: Executive Meeting.  
 Nov. 20.—New South Wales Branch, B.M.A.: Clinical Meeting.  
 Nov. 25.—New South Wales Branch, B.M.A.: Ethics Committee.  
 Nov. 26.—Victorian Branch, B.M.A.: Council Meeting.  
 Nov. 27.—New South Wales Branch, B.M.A.: Branch Meeting.

### Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

**New South Wales Branch** (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phoenix Mutual Provident Society.

**Victorian Branch** (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

**Queensland Branch** (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute; Brisbane City Council (Medical Officer of Health). Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

**South Australian Branch** (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

**Western Australian Branch** (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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